Design Concept Report

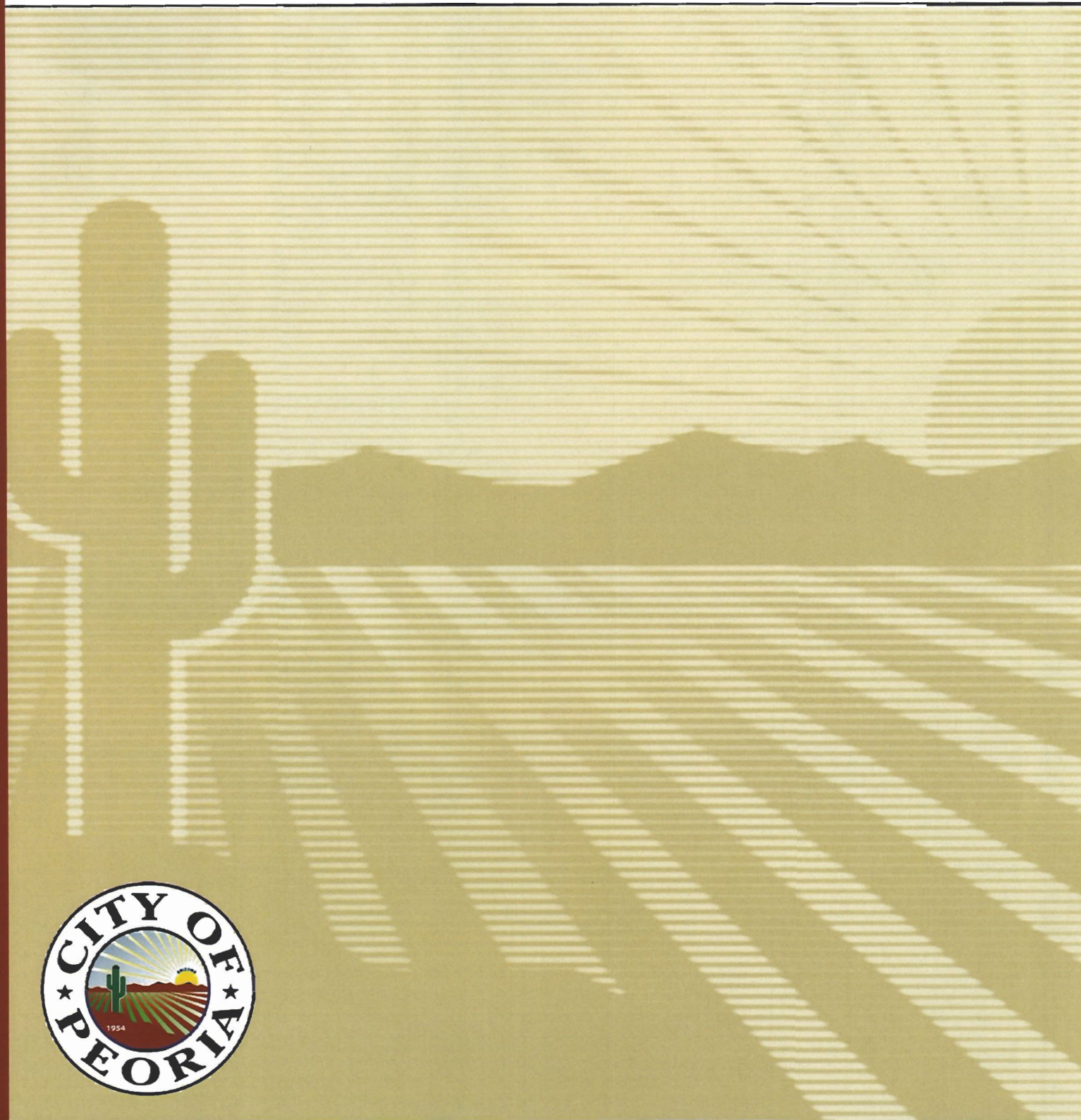
Beardsley Rd Connector

July 2006

Prepared For:

CITY OF PEORIA
ENGINEERING
DEPARTMENT

In conjunction with
Arizona Department of Transportation and The City of Glendale, Arizona



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FINAL
DESIGN CONCEPT REPORT

Beardsley Road Connector

This signature acknowledges receipt of final report

7/7/06
For Engineering Director Date

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1.0 EXECUTIVE SUMMARY

Prior to the development of this Design Concept Report (DCR) the North Central Peoria/Northwest Glendale Circulation Study was completed in October 2002. This study identified both short term and long term improvements that encompassed the project area. The results of the study confirmed the need for an additional access to SR 101L from Beardsley Road due to the high volume of traffic at the interchanges of Union Hills and 75th Avenue. Included in this project, the circulation study will be updated and the traffic volumes will be validated. The new connection would improve traffic operational characteristics and safety for this region, and would relieve congestion at these two locations. The connector consists of the extension of Beardsley Road east of 81st Avenue that provided direct access from either the 75th Avenue interchange or the Union Hills interchange depending on the direction of travel. The concept did not include a southbound frontage road that connected the two interchanges. A U-Turn structure was presented that provided direct access from Beardsley Road to northbound SR 101L without entering the Union Hills interchange.

The Union Hills interchange and 75th Avenue interchange currently experience heavy congestion during peak hours. These interchanges are the access points onto SR 101L for the majority of the traffic from the northwest region. With the projected growth in this area these two intersections will become more congested and operate at a lower level of service. In addition, major arterials leading to these intersections will also become more congested. An additional access onto SR 101L will reduce the traffic at the Union Hills and 75th Avenue interchanges. These intersections as well as the major arterials in the vicinity will operated more efficiently with this project.

The City of Peoria initiated this study of the Beardsley Connector to SR 101L to develop long-term improvements to traffic operations and safety for the area. The study area encompassed three separate jurisdictions; the City of Peoria, the City of Glendale, and the Arizona Department of Transportation. There was extensive coordination with all three of these agencies to determine the needs and goals for the project. The project study is documented in this DCR and Draft Environmental Overview.

There were two alternatives studied during the development of the preliminary design. Within these two alternatives there were several iterations and details that were evaluated and studied. The process started with using the recommendation of providing a new connection to SR 101L at Beardsley Road that was presented in the North Central Peoria/Northwest Glendale Circulation Study. This alternative was revised and modified to meet the more specific needs of the City of Peoria, Arizona Department of Transportation, City of Glendale, and the residents in the area. Alternative 1 was presented at the first public meeting for the project. There were several comments and questions regarding why a full interchange could not be constructed at Beardsley Road. The more specific concern was why was traffic still required to travel through the 75th Avenue intersection and the Union Hills Drive intersection. After this public meeting Alternative 2 was developed to address those questions and concerns. Alternative 2 revised the existing southbound SR 101L ramp configuration between Union Hills Drive and 75th Avenue. This reconfiguration of the ramps allows access to and from Beardsley Road without entering the two intersections of concern. A summary of the alternatives can be found in Section 3, Design Concept Alternatives.

The frontage road design was developed to accommodate future widening on SR 101L. The proposed alignment will eliminate the need to reconstruct the frontage road when future widening is completed and minimizes impacts to the access ramps. The future needs within the

project limits were also considered. Some of the issues that were evaluated include access to properties, future utility needs, pedestrian uses, and traffic demands.

This project will be funded jointly between the City of Peoria and through the Maricopa County ½ cent sales tax. Currently construction funding is programmed for the 2009 and 2010 fiscal year. There is interest in shifting funding to accelerate this project, but there has not been an official action to accomplish this to date. The construction cost estimate for this project is based on available current information. Construction costs have been fluctuating dramatically within the past year. Although it is unknown what the future unit prices of the project will be, the increasing cost should be taken into account when considered funding for this project.

The recommended alternative to continue forward for final design is Alternative 2. This alternative will remove the Beardsley Road traffic from the 75th Avenue and Union Hills Drive intersections satisfying the purpose and need of the project. In addition, there is sufficient weaving distance for vehicles to align themselves in the proper lane eliminating the need for a braided ramp. The current construction cost estimate is $15,348,600, Right of Way is $5,219,000, and Engineering is $1,200,000 for a total project cost of $21,767,600. This alternative is more cost affective and meets the needs of the traveling public.

2.0 INTRODUCTION

2.1 Background

The Maricopa County Department of Transportation (MCDOT) completed the Northwest Valley Transportation Study in 2000 in response to the rapid growth the area has been experiencing over the past decade. This study evaluated the transportation demands of the area which extended into portions of Maricopa County and the cities of Peoria and Glendale. While this study was being conducted the cities of Peoria and Glendale were in the process of completing the General Plan for their respective cities. During the development of their plans, the City of Peoria identified a number of transportation issues and locations that required further study. This need initiated the development of the North Central Peoria/Northwest Glendale Circulation Study, which was a more focused study than the MCDOT study. The Circulation Study identified potential short-term and long-term improvements needs between 67th Avenue to 91st Avenue and Bell Road to Happy Valley Road. The results of the study confirmed the need for a Beardsley Road connection to the SR 101L. The interchanges of Union Hills and 75th Avenue experience high traffic volumes and congestion during peak hours. The connector would improve traffic operational characteristics and safety for this region, and would relieve congestion at these two locations. The connector consists of the extension of Beardsley Road east of 81st Avenue that provided direct access from either the 75th Avenue interchange or the Union Hills interchange depending on the direction of travel and a U-Turn structure just north of the Union Hills Drive Overpass that would provide access to northbound SR 101L from Beardsley Road.

2.2 Project Purpose and Need

The purpose of the project is to develop long-term improvements to traffic operations and safety for the existing connections to SR 101L at Union Hills and 75th Avenue by providing an additional connection from Beardsley Road. With the current and anticipated growth of this northwest region, traffic volumes will continue to increase. Currently, Union Hills experiences heavy congestion during peak hours between 83rd Avenue and SR 101L. Recent development along Union Hills has contributed to the traffic operational problems in the area. Likewise, 75th Avenue also carries high volumes of traffic between SR 101L and Deer Valley Road.

The Union Hills interchange and 75th Avenue interchange are the access points onto SR 101L for the majority of the traffic from the northwest region. An additional access onto SR 101L within the vicinity of these two interchanges will relieve these congested intersections.

There is an existing multi use path to the north of the project just east of the Fletcher Heights development and to the south just east of Oraibi Drive. This project will connect the two paths to provide continuity for the trail system. Although it is not part of this project, the City of Peoria is considering the development of a trailhead within the project limits. It will be located in a portion of the southeast parcel of 81st Avenue and Beardsley Road. The trailhead will serve as a major multi-modal link to the existing trail systems within the area. This project will also connect the multi-use path from 81st Avenue south of Beardsley Road to 83rd Avenue north of Beardsley Road.

The Beardsley Connector Design Concept Report will identify the specific major design features of the Beardsley Road extension and the connection to SR 101L. The development of the design will consider; existing conditions and utilities, existing and future traffic demands, existing and future pedestrian needs, interaction with future trailhead, drainage and hydrologic issues associated with the crossing of New River, potential conflicts with the Beardsley Channel, interaction of connector traffic with SR 101L ramp traffic, future widening of SR 101L, new structures over New River and SR 101L, impacts to properties along the east bank of New River, intersection improvements, coordination with the cities of Peoria and Glendale and the Arizona Department of Transportation (ADOT), and the staging sequence that will be required for implementation of necessary improvements.

This Design Concept Report presents various alternatives for the different project segments and evaluates them separately. These segment alternatives are also evaluated on how they will conform and operate as part of the whole project. The evaluation will determine a recommended alternative for each segment. The total recommended alternative for the project is a composite of the various segments. See Figure 2.1 and Figure 2.2 for the project study area.

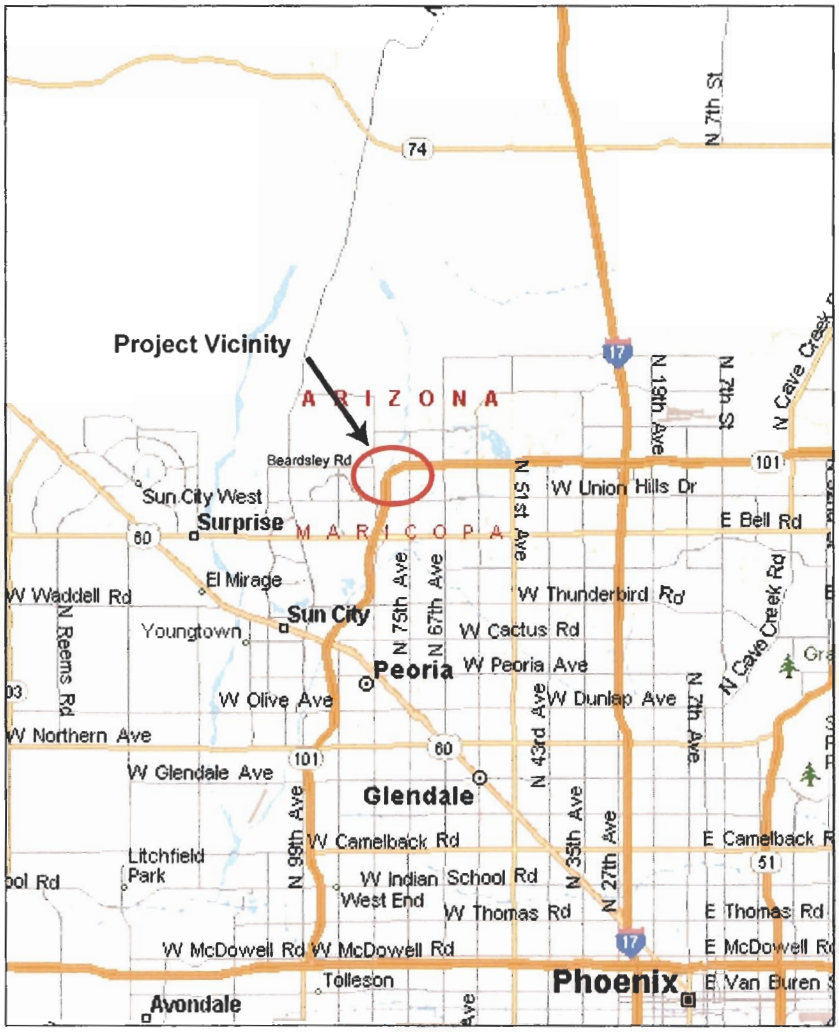


Figure 2.1 Project Vicinity Map

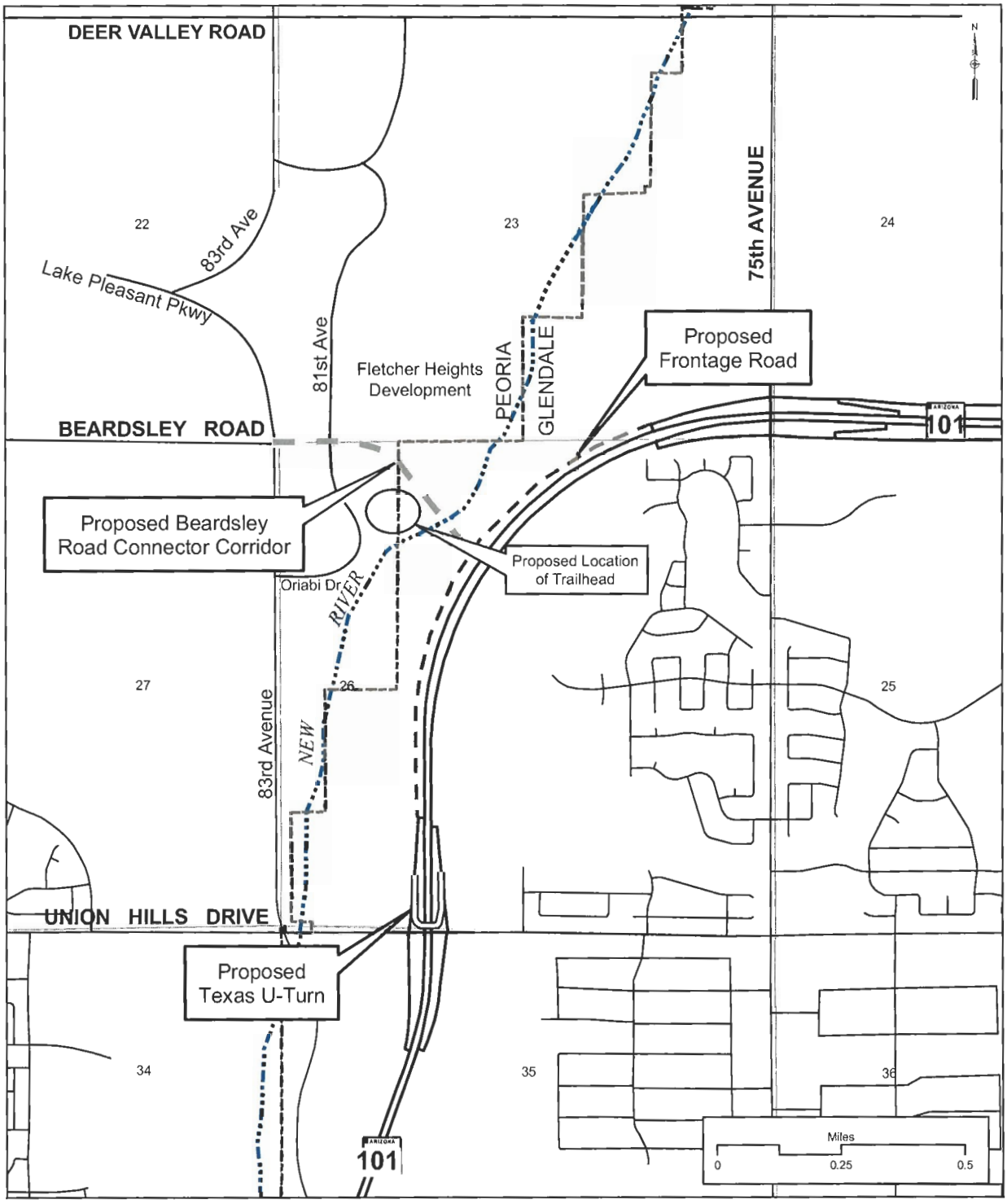


Figure 2.2
Project Location Map

2.3 Project Description

The project is located within the city limits of Peoria and Glendale from 83rd Avenue to SR 101L and Union Hills to 75th Avenue. The project proposes to extend Beardsley Road east of 81st Avenue over New River and connection to a new southbound (SB) frontage road that parallels SR 101L. The connection with the frontage road will be a free movement for vehicles traveling to and from Beardsley Road. The new SB frontage road will extend between Union Hills Drive to 75th Avenue where it will provide an extension of the existing frontage road east of the 75th Avenue interchange. Access for NB SR 101L traffic from Beardsley Road will be provided by a separate "U-turn" structure located just north of the Union Hills Overpass. Traffic making this movement will not be required to enter the Union Hills intersection and can proceed onto the SR 101L with a free flow movement.

The existing section of Beardsley Road between 83rd Avenue to 81st Avenue will be widened to accommodate a 5-lane section. The extension of Beardsley Road will continue this 5-lane section of two through lanes and a continuous left turn lane. The frontage road will be a minimum of two lanes and widening up to four lanes at the intersection with Beardsley. The "U-turn" structure will be one-lane with wide shoulders to accommodate truck movements and provide a refuge area for disabled vehicles.

Recommendations for operational improvements have been evaluated for the intersections of 81st Avenue and 83rd Avenue along Beardsley Road. Recommendations include turning lanes, traffic control and traffic calming. There is a concern from the Fletcher Heights residents regarding the cut-through traffic on 81st Avenue. This project will take steps to implement measures to deter the cut-through traffic.

Drainage has been evaluated to determine the profile of the New River Bridge. This bridge will accommodate the 100-year storm while providing a two foot clearance from the high water elevation to the lowest point on the superstructure. An evaluation has also been completed for the roadway drainage along Beardsley and the frontage road. The drainage along the frontage road will be conveyed in either new or existing storm drain systems.

Future utility services have been evaluated for the proposed trailhead and the parcels east of New River. Service stub-outs will be provided at each of these locations that will include water, sewer, and electrical services. The City of Peoria will provide water and sewer service to those parcels within the city limits west of New River where the Trailhead is proposed. East of New River within the City of Glendale water and sewer service will be provided by the City of Glendale. Electrical, gas, telephone, and cable services will be extended from 81st Avenue east to provide service to these parcels east of New River. The connections for these services will be constructed once development occurs.

The City of Peoria will work with ADOT to develop an Inter Governmental Agreement on shared project costs, future maintenance and repairs for the portion of the project within ADOT right of way. ADOT Valley Project Management will work directly with the City of Peoria with input from the Phoenix Construction District and Phoenix Maintenance District during the development.

2.4 Project Setting

The project area is located in the north central portion of the City of Peoria and the northwest portion of the City of Glendale, in Maricopa County, Arizona. The boundary between Peoria and Glendale roughly follows New River, typically a dry riverbed that traverses diagonally through the project area from north-northeast to south-southwest. The project area is in the southeast portion of a large residential section of Peoria. This residential area encompasses 13 square-miles and is bounded by the Agua Fria River on the west, Sun City and Union Hills Drive on the south, New River on the east, and Pinnacle Peak Road on the north. Commuter traffic typically funnels southeasterly to two access points to SR L101, one at 75th Avenue and the other at Union Hills Drive.

The project area contains one component of the State Highway System: SR 101L (Agua Fria Freeway) and several major urban arterials. The urban arterials that influence traffic within the project limits include: Beardsley Road, 83rd Avenue, Lake Pleasant Parkway, Union Hills Drive, Deer Valley Road, and 75th Avenue. Collector streets include: 81st Avenue and Oraibi Drive.

A large residential area to the north and west of the project is bisected by Lake Pleasant Parkway, a four-lane divided, east-west major arterial that curves southerly and ends at the intersection of Beardsley Road and 83rd Avenue.

The project is predominately on new alignment, which will provide access from the arterial roadways to an urban freeway. The area that this project will service will typically be residential, but it will provide development opportunities for previously land-locked parcels east of New River. Providing an additional access onto SR 101L will relieve congestion at the existing 75th Avenue and Union Hills Drive interchanges. The type of traffic at these two locations is a mix between residential and commercial.

2.5 EXISTING CONDITIONS

2.5.1 Roadway System

SR 101L is a Portland Cement Concrete Pavement (PCCP) surface six-lane divided urban freeway consisting of three 12-foot lanes in each direction with 10-foot outside shoulders, 8-foot asphalt concrete surface inside shoulders and a variable width open median. Recently, there was a 1-inch Asphalt Rubber – Asphalt Concrete Friction Course (AR-ACFC) overlay placed on the PCCP surface as part of ADOT's Quiet Pavement Program. There is an auxiliary lane in the northbound direction beginning at the northbound on ramp at Union Hills Drive TI and terminating at the northbound off ramp at 75th Avenue TI. The roadway profile is depressed under both Union Hills Drive and 75th Avenue. Access is controlled and restricted to the Union Hills Drive and 75th Avenue diamond type traffic interchanges. Cross drainage is accommodated by a 48" pipe culvert under both roadways ½ mile north of Union Hills Drive and another 48" pipe culvert under both roadways ¾ mile north of Union Hills Drive. Existing right-of-way varies in width from 325 feet to 638 feet.

Beardsley Road between 83rd and 81st Avenues was originally constructed as a part of the Fletcher Heights residential development. It is a 52-foot wide asphalt

concrete surface roadway with curb and gutter on both sides. There are two westbound lanes beginning at 83rd Avenue that merge to one lane approaching 81st Avenue. The eastbound direction has one lane and there is a continuous left-turn lane between the intersections. There is an access to a residential development to the north at 82nd Avenue and a driveway directly south of 82nd Avenue to Sonoma Ridge Apartments. Pavement drainage is accommodated by two catch basins 122 feet west of 81st Avenue. Residential storm water outlets into the Fletcher Heights Channel, which crosses 81st Avenue in a 4x4x8 box culvert north of Beardsley Road. The channel runs in an east-west direction until it outfalls into New River. Offsite drainage is typically retained on private property. Existing right-of-way along Beardsley Road is 90 feet, 45 feet each side of the centerline. Beardsley Road is classified as an arterial on the City of Peoria's General Plan.

Beardsley Road west of 83rd Avenue is a 64-foot wide asphalt concrete surface roadway with curb and gutter on both sides and consists of a continuous two way left turn lane, two westbound lanes, one eastbound lane, and one eastbound right turn lane at the intersection. The north curb aligns with the north curb line of Beardsley Road east of 83rd Avenue. Access onto Beardsley is limited to 83rd Lane, 87th Avenue, and 91st Avenue. Pavement drainage is accommodated by catch basins, storm drain system, and a drainage channel. Existing right-of-way east of 83rd Avenue is 90 feet, 45 feet each side of the centerline.

83rd Avenue south of Beardsley Road is a 106-foot wide asphalt concrete surface roadway with curb and gutter on both sides. It consists of three lanes in each direction with a painted median that is wide enough to accommodate dual left turn lanes to westbound Beardsley Road. Parcel access is limited to Oraibi Drive, Village Parkway, and several driveways to commercial properties along the southern portion of 83rd Avenue. Pavement drainage is accommodated by catch basins and a storm drain system. Existing right-of-way is 150 feet.

83rd Avenue north of Beardsley Road curves to the west and becomes Lake Pleasant Parkway (LPP). LPP consists of two lanes in each direction with a median that is wide enough to accommodate future construction of dual left turn lanes. There is sufficient room to accommodate future widening of one lane to the outside. Approximately 1/3 mile north of Beardsley Road on LPP is an intersection that provides access to 83rd Avenue to the north via dual right turn lanes. Access is limited to major side streets and a few commercial driveways. Existing right-of-way is 150 feet.

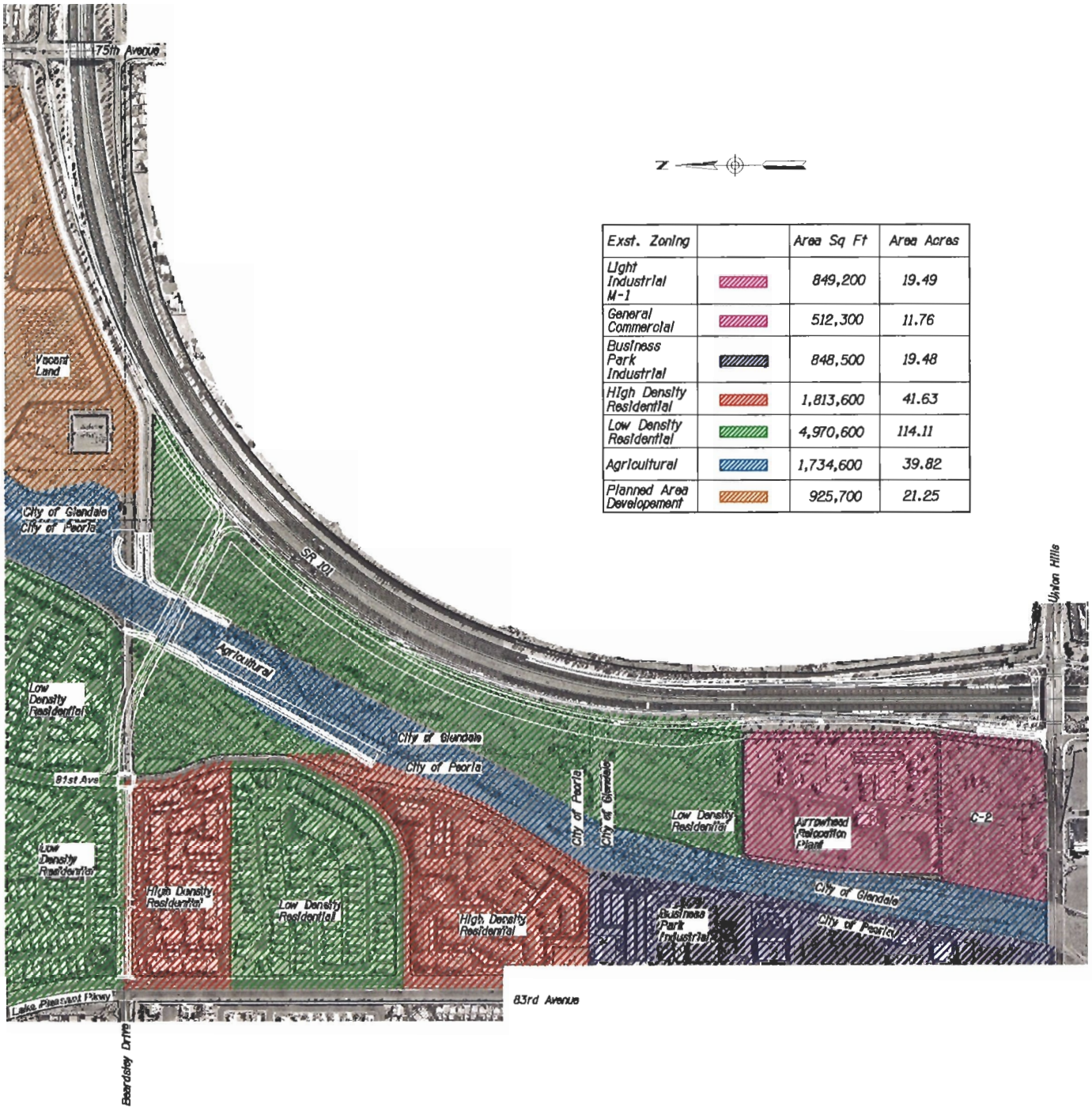
Union Hills Drive between 83rd Avenue and SR 101L is a varying width asphalt concrete surface roadway with curb and gutter on both sides. Union Hills Drive crosses over New River via a multi-span bridge. The typically section on Union Hills is three-lanes in the eastbound direction and three-lanes in the westbound direction with left and right turn lanes into the Glendale Northwest development on the south side of the road. Recently, there was a commercial development constructed on the north side of 82nd Avenue directly across from the Glendale Northwest development. Access is limited to 82nd Avenue and to the City of Glendale sewerage treatment plant located north of Union Hills Drive along the west right-of-way of the SR 101L. Existing right-of-way is 130 feet.

Oraibi Drive was originally constructed as a part of the Fletcher Heights residential development. It is a 40-foot wide asphalt concrete surface roadway with roll type curb and gutters on both sides. The roadway profile is close to surrounding terrain. Access is via side streets and driveways. Pavement drainage is accommodated by catch basins and a storm drain system. Existing right-of-way is 80 feet.

As Oraibi Drive curves to the north and intersects with Beardsley Road it becomes 81st Avenue. North of Beardsley Road on 81st Avenue the pavement width is 40-feet. There is curb and gutter on each side. The existing right of way is 80-feet and the intersection of Beardsley Road and 81st Avenue / Oraibi Drive is a 3-way stop condition.

2.5.2 Land Use

The General Plans for the cities of Peoria and Glendale designate land uses within the project area as low density residential [2 to 5 dwelling units per acre (du/acre)], high-density residential (15 or more du/acre), commercial, business park/industrial, and agricultural/flood zones (Figure 2.3 – Land Use Map). Land uses to the north of Beardsley Road include vacant land, a church, and a low-density residential subdivision. West of SR 101L from Beardsley Road south to Union Hills Road, land uses consist of low and high-density residential developments, business park/industrial, commercial uses, the Arrowhead Relocation Plant, and the New River. East of SR 101L, low-density residential subdivisions represent the most prominent land use with a small church located on the northeast corner of Union Hills Drive and SR 101L. Commercial and high-density residential uses, such as a Wal-Mart and apartments, are located south of Union Hills Drive.



Exst. Zoning		Area Sq Ft	Area Acres
Light Industrial M-1		849,200	19.49
General Commercial		512,300	11.76
Business Park Industrial		848,500	19.48
High Density Residential		1,813,600	41.63
Low Density Residential		4,970,600	114.11
Agricultural		1,734,600	39.82
Planned Area Developement		925,700	21.25

Figure 2.3
Land Use Map

2.5.3 Pedestrian Traffic

Within the project area there are several multi-use paths. Several of the existing paths do not connect to provide continuity. There are two north-south paths in the vicinity. One is along the west bank of New River. It is completed to a point south of the project around Oraibi and then begins again at the southern boundary of the Fletcher Heights subdivision. There is also a bike lane adjacent to Oraibi Drive. The bike lane continues adjacent to Oraibi north of Beardsley along 81st Avenue. There is discontinuity in the path between the intersections of Oaibi and 83rd Avenue on Beardsley.

There is an elementary school approximately ½ mile north of Beardsley on 81st Avenue. Throughout the year, but particularly during the school year there is pedestrian traffic that cross at Beardsley Road from the Sonoma Ridge Apartments and residential areas to the south.

2.5.4 Utilities

A total of seven utility and infrastructure providers serve the project area. Table 2.1 provides the location and characteristics of utilities within the project area. Additionally, ADOT owns a fiber optic line that runs within ADOT SR 101L right-of-way, which is for departmental use only.

Table 2.1 – Utilities Within Project Area

Water			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
City of Peoria	83rd Avenue	North of Beardsley Road to south of Union Hills Drive	12" DIP
New River Utility Co.	Beardsley Road	81st Avenue to 83rd Avenue	12"
	82nd Avenue	Throughout Fletcher Heights	Varies
	81st Avenue	North and South of Beardsley Road	8" PVC
City of Glendale	100' north of the 75th Avenue on-ramp to SB SR 101L	From 75th Avenue to 850' west, parallel to on-ramp	12"
	75th Avenue	North and South of project area	12"
	Union Hills Drive	East and West of project area (under SR101L at crossing)	12"
Cable Television			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
Cox Communications	Beardsley Road	83rd Avenue to 81st Avenue	2" – 3"
	82nd Avenue	Throughout Fletcher Heights	2" – 3"
	81st Avenue, center of east sidewalk	Beardsley Road to north of the project area	2" – 3"
	83rd Avenue	Beardsley Road to north of the project area	2" – 3"

Table 2.1 con't

Fiber Optic			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
City of Peoria	83rd Avenue	Union Hills Road to Beardsley Road	Interconnect Conduit
Cox Communications	83rd Avenue	North and South of Beardsley Road	Underground
Telephone			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
Qwest Communications	83rd Avenue	North and South of Beardsley Road	ND
	Beardsley Road	West of 83rd Avenue	ND
	75th Avenue	North and South of SR 101L	ND
Wastewater			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
City of Peoria	83rd Avenue	From Beardsley Road intersection north	ND
	Beardsley Road	From 83rd Avenue to 81st Avenue	12"
	82nd Avenue	Throughout Fletcher Heights	ND
	81st Avenue	From Beardsley Road to north of the project area	ND
City Glendale	75th Avenue	North and South of the project area	21"
	125' north of the 75th Avenue SR 101L SB on-ramp	Parallel to the SR 101L SB on-ramp from 75th Avenue, from 100' east of 75th Avenue to the waste water treatment plant near Union Hills Drive	21" VCP
	SR 101L	Under SR 101L at Union Hills Drive	6" DIP FM
	SR 101L	From Union Hills Drive, parallel to the east side of SR 101L to 740' north, then crosses SR 101L to the waste water treatment plant	42"
Storm Drain			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
City of Peoria	Beardsley Road	83rd Avenue to 81st Avenue	
	81st Avenue	North of Beardsley Road	
Electric			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
Arizona Public Service	Beardsley Road	83rd Avenue to 81st Avenue	Underground
	Intersection of Beardsley Road and 81st Avenue	From the intersection continuing East	Underground
	83rd Avenue	From Beardsley Road continuing South, East-West crossing South of Beardsley Road intersection	Underground
	81st Avenue	North and South of project area	Underground
	Beardsley Road	From East to West of project limits	Overhead
	81st Avenue	South of Beardsley Road to Intersection	Overhead

Table 2.1 con't

Gas			
Provider	*Location*	*Limits*	*Size, Materials, Comments*
	SR101L	West of 83rd Avenue	Overhead
	Union Hills Drive	83rd Avenue to 75th Avenue	Overhead
Southwest Gas	83rd Avenue	North and South of the project area	4" PE
	Beardsley Road	81st Avenue Median to 83rd Avenue	4" PE
	82nd Avenue	Throughout Fletcher Heights	2" PE
	81st Avenue	Beardsley Road to North of the Project Area	2" PE

ND – Not Determined

2.5.5 Drainage

The existing drainage facilities for the Agua Fria Freeway may be divided into three distinct systems for the subject reach. First, a drainage channel was constructed along the north side of the Agua Fria Freeway. This channel discharges into the New River at Beardsley Road (extended). The channel was designed to accommodate storm water generated from outside of the freeway corridor as well as onsite storm water from the freeway adjacent to the channel. Second, a drainage channel was constructed along the east side of the freeway. This channel flows south to Bell Road and crosses the freeway within the project limits and discharges into the New River. Third, a small portion of flow from the freeway embankment flows west toward New River. The development immediately east of the freeway (Utopia Park) was designed with numerous lakes/retention basins. It was assumed that offsite storm water would not contribute to the freeway in the area bounded by 75th Avenue and Union Hills Drive.

The existing onsite storm drain system was designed as an at-grade freeway (i.e., 10-year return interval). The storm drain system utilized a minimum 24" pipe size. Therefore, it is likely that inlets along the proposed frontage road may be connected to the existing freeway system without adversely impacting the hydraulic operation of the system.

2.6 OTHER PROJECTS IN THE VICINITY

The City of Peoria currently has a project programmed to extend the raised median island on 83rd Avenue north of Village Parkway to Beardsley. The limits of this project will tie into an existing median island to the south and continue to the intersection. In addition, Happy Valley Road will be extended from 75th Avenue to Lake Pleasant Parkway. This project will connect a major arterial roadway to the north.

The North Central Peoria/Northwest Glendale Circulation Study is currently being updated with current traffic volumes. It is anticipated that improvements will be recommended at the intersections of 83rd Avenue and Lake Pleasant Parkway, and 83rd Avenue and Deer Valley Road. The improvements at these locations will help facilitate the future traffic volumes in this area due to continued development.

3.0 DESIGN CONCEPT ALTERNATIVES

3.1 Introduction

There were two alternatives studied during the development of the preliminary design, Figures 3.1 and 3.2. Within these two alternatives there were several iterations and details that were evaluated and studied. The process started with using the recommendation that was presented in the North Central Peoria/Northwest Glendale Circulation Study. This alternative was revised and modified to meet the more specific needs of the City of Peoria, Arizona Department of Transportation, City of Glendale, and the residents in the area. Alternative 1 was presented at the first public meeting and there were several comments and questions regarding why a full interchange could not be constructed at Beardsley Road. If a full interchange was constructed there would be substantial visual and noise impacts to the adjacent properties. In addition it created geometric issues with the spacing between the 75th Avenue and Union Hills interchanges. Lowering the profile grade to mitigate the visual and noise impacts and creating an additional frontage road to resolve spacing issues increased construction costs by 70%. The more specific concern was why was traffic still required to travel through the 75th Avenue intersection and the Union Hills Drive intersection. After that public meeting Alternative 2 was developed to address those questions and concerns.

3.2 Design Concept Alternatives Studied

The Beardsley Connector project alternatives are best described by breaking them into several geographic/functional components. There are many similarities in the two alternatives. These similarities will be discussed in Section 3.2.1 through 3.2.5. Section 3.2.6 will discuss Alternative 1 in detail and Section 3.2.7 will discuss Alternative 2 in detail.

3.2.1 Beardsley Road (81st Avenue to 83rd Avenue)

This segment is common to both alternatives and consists of widening Beardsley Road to the south to accommodate a five-lane section. The north curb will be maintained. The north sidewalk will be reconstructed from the existing 5-foot wide meandering sidewalk and widened to a 10-foot wide multi-use path. It will connect the multi-use path that parallels 83rd Avenue on the east side to a new trailhead site in the southeast quadrant of 81st Avenue and Beardsley Road. Additional multi-use paths will be constructed along the west bank of the New River, thus completing the multi-use path system in this area.

Dual right turn lane for westbound Beardsley Road to northbound Lake Pleasant Parkway (LPP) will be included. There will be impacts to the existing landscaping in the northeast corner of the intersection to accommodate the widening. The impacts will be minimized with a retaining wall. Southbound LPP will be restriped to accommodate dual left turn lanes. There is sufficient pavement width available therefore roadway widening will not be necessary. The south leg of the intersection, 83rd Avenue, currently has 3-through southbound lanes, 2-through north bound lane, and a right and left turn lane. The third through lane south of the intersection turns into the designated right turn lane.

There are two catch basins on Beardsley Road located west of 81st Avenue intersection. These catch basins collect pavement drainage on Beardsley Road and convey it to a storm drain which outlets into the Fletcher Heights Channel. Catch basins located on the south side of Beardsley where the roadway will be widened will require relocation to the new curb and gutter.

The roadway cross section of 81st Avenue at Beardsley Road is a three-lane street with curb and gutter and sidewalks. The widening on 81st Avenue will be limited to a new northbound right turn lane to eastbound Beardsley Road. A southbound left turn lane to eastbound Beardsley Road will not be added to help discourage cut-through traffic on 81st Avenue north of Beardsley Road. In addition, traffic calming will be included at the intersection and approximately 500-feet north of the intersection. Included in this project, a traffic signal is proposed at this intersection.

An alternative solution to signalizing the 81st and 83rd Avenue intersections is a roundabout. With the high volume of traffic on two legs of each intersection, this could increase the operational capacity of a roundabout. During final design a study will be initiated to evaluate the operations, cost, and impacts of placing roundabouts on Beardsley Road at the intersections of 81st Avenue / Oraibi Drive and 83rd Avenue/Lake Pleasant Parkway.

3.2.2 Beardsley Road Extension (81st Avenue to SB Frontage Road)

This segment is common to both alternatives and consists of extending Beardsley Road easterly from the intersection with 81st Avenue to the new southbound frontage road. It will be a five lane section and cross New River. The new bridge will be a three span concrete girder bridge.

The profile of the extension is kept as low as possible to reduce both noise and visual impacts to Fletcher Heights residents just north of the project. The multi-use path will cross under the new bridge parallel to the west abutment of the bridge. The profile will be established to provide a minimum 10-foot clearance for the multi-use path. The roadway profile will match existing pavement at 81st Avenue to provide a smooth ride through the intersection and tie into the frontage road profile. The profile will also be set to meet or exceed minimum grade requirements for curb and gutter, especially between the bridge and the frontage road.

With a design speed of 50 mph, the horizontal alignment has been set to avoid superelevation run out on the bridge. The new roadway conflicts with an existing major overhead transmission power pole east of the 81st Avenue intersection and the existing Fletcher Heights Drainage Channel. The transmission pole will require relocation. The initial solution for resolving the conflict with the Fletcher Heights Channel was to extend the existing concrete box culvert under 81st Avenue under the Beardsley Road extension and construct a new channel that connects to the New River at a point south of the west bridge abutment. An alternative design maintains the existing channel by constructing a retaining wall along the north side of Beardsley Road in the vicinity of the channel. Minor regrading of the channel will be required to maintain the drainage capacity of the

channel without raising the high water elevation for the design year storm event. A cost comparison of the two alternatives was performed and utilizing the existing channel was determined to be the most cost effective and is recommended for inclusion in the final design. The comparative costs are:

Fletcher Heights Channel – RCB Box Culvert	$1,055,400
Fletcher Heights Channel – Retaining Wall	$ 349,500

The profile of this component is also based on providing adequate freeboard between the low chord of the bridge girders and the 100-year high water elevation at the bridge site as defined by the Middle New River Watercourse Master Plan, prepared by FCDMC in May 2000. This elevation is based on ultimate channelization of New River with new armored banks. The west bank of New River will be constructed to comply with design requirements in the report between the Fletcher Heights Channel outfall structure on the north and existing west bank improvements to the south. The total length of new west bank constructed will be approximately 1,600 feet. A portion of new east bank will be constructed between the north side of the ADOT Beardsley Drainage Channel, which outfalls into New River upstream of the Beardsley Road extension and a point approximately 200 feet south of the east abutment of the New River Bridge. The east bank will also be constructed to comply with design requirements from the Middle New River Watercourse Master Plan. Both banks will have armoring for erosion protection from flows in New River. The west bank will include two ADA compliant access ramps that will become a part of the multi-use path system along the west bank of New River. The northerly ramp will be located south of the Fletcher Heights Channel outfall structure and the southerly ramp will be located south of the west abutment of the bridge over New River. The ramp system will allow pedestrian and equestrian traffic to travel along the west bank and pass under the new bridge. The portion under the bridge will be flooded during large flows in New River, but a low flow channel will be constructed under the bridge to protect the multi-use path from small nuisance flows.

Residents in Fletcher Heights may receive some headlight glare from westbound vehicles on Beardsley Road. To mitigate this, a 42-inch concrete barrier will be constructed along the north side of Beardsley Road east of the 81st Avenue intersection to the New River Bridge.

Currently, there is landscaping and an entrance feature for Fletcher Heights east of 81st Avenue within the proposed alignment of Beardsley. Construction of this segment will require the relocation of landscaping and the entrance feature.

3.2.3 SR 101L (75th Avenue to Union Hills)

Currently SR 101L is a 6-lane facility with 3-lanes in each direction. The ultimate configuration will include an HOV lane and a forth general purpose lane. The HOV lane will be in the median while the general purpose lane will be constructed as an outside lane. Auxiliary lanes are being included in areas along SR 101L where they are warranted. Currently there is an auxiliary lane for eastbound traffic between Union Hills and 75th Avenue. With the construction of the recommended alternative, an auxiliary lane will not be required in the

westbound direction. All design components of this project, including the alignment of the frontage road, will accommodate the future improvement on SR 101L. The ramp alignments also consider the future widening of SR 101L. The preliminary design of the ramps will minimize the reconstruction when the freeway is widened. The bridge abutments for the U-turn structure will consider future widening of SR 101L and allow sufficient clearance.

3.2.4 U-Turn Structure

The U-Turn structure provides a route over SR101L for southbound frontage road traffic wishing to access northbound SR101L without entering the Union Hills Drive intersections.

Three bridge configurations were developed and evaluated during the preliminary design process; 1) Widen the existing Union Hills Bridge, 2) Construct a new structure with a lower design speed and smaller radii, 3) Construct a new structure with a higher design speed and larger radii. The first alternative did not allow for future widening and created clearance issues on SR 101L. This alternative was disregarded. The second alternative was parallel to Union Hills Drive with sharp radii on each approach with a design speed of 25 mph. The third alternative included a sweeping curve over the entire structure with a maximum design speed of 30 mph. Cast-in-place girders are required for the higher speed configuration which increases construction costs. Therefore, the second alternative, lower design speed and smaller radii is recommended for further consideration.

The abutments for the U-turn Bridge will align with the existing Union Hills Drive Bridge abutments to provide a uniform offset from SR 101L. The structure will be two-span with pre-cast AASHTO Type VI girders. The girders will not be parallel and will flare out at each abutment, as the bridge widens at each end to accommodate the off-tracking of commercial trucks using the U-Turn. Retain walls/wingwalls will be required at each abutment.

The U-Turn Bridge will be separated from the existing Union Hills Drive Bridge by a minimum of 39-feet to provide space between the bridges for the future widening of Union Hill Overpass and sufficient area during construction.

The profile for the U-Turn bridge will be set to provide a minimum 16'-5" vertical clearance over SR 101L. As the profile of SR 101L rises in elevation north of Union Hills, the profile for the U-turn was also required to rise to provide sufficient clearance. The deck surface of the U-turn structure will be approximately 2 feet higher than the deck surface of the Union Hills Bridge.

The southbound approach to the U-turn structure splits from the southbound frontage road. The location of the split is sufficient distance from Union Hills Drive to provide adequate storage at the signalized intersection. There is also adequate decision time and weave distance from the Beardsley connection for vehicles to maneuver into their proper lane assignments.

There have been two alternatives studied for the northbound Union Hills Drive on-ramp. One alternative merges the U-Turn traffic with the Union Hills traffic and

extends the ramp north to provide sufficient merge distance. The second alternative provides separate on-ramps for the U-Turn traffic and the Union Hills traffic. The first alternative operates sufficiently until the ramp is metered. Once the ramp is metered there are large delays on the U-Turn structure. Since this project is anticipating the future installation of traffic metering the second alternative will be recommended. The northbound Union Hills Drive on-ramp will provide a separate on-ramp for the U-Turn traffic and the Union Hills traffic. Traffic from the U-Turn structure will enter SR 101L south of the existing Union Hills on-ramp. Approximately 1200-feet north the on-ramp from Union Hills will enter SR 101L.

3.2.5 Southbound Frontage Road

The proposed southbound frontage road generally parallels SR 101L. Horizontally, it is offset a sufficient distance to accommodate the future widening for the forth general purpose lane. The frontage road is a minimum of two 12-foot lanes and widens to accommodate additional lanes as needed.

Several factors were considered during the development of the horizontal alignment for the frontage road. The north end of the frontage road lies between SR 101L and the Beardsley Channel. At the location where the channel turns westerly away from the freeway the available space for the frontage road is very narrow. Early alignments with multiple lanes on the frontage road pushed the frontage road into conflict with the Beardsley channel, requiring either enclosure or realignment of the channel. To avoid right of way acquisition from the Church of Joy, all of the alternatives involving conflicts with the channel used a channel enclosure as a solution rather than realigning the channel.

Another factor that was considered is the existing 21" sanitary sewer that parallels SR 101L. The sewer line lies within a 20-foot wide strip that is within ADOT right-of-way, but outside access control. The strip is fenced on both sides and is strictly for access to the sanitary sewer for maintenance. The north end is gated and is located near where the Beardsley Channel turns westerly towards New River. The south end is gated and enters the north wall of the Glendale Sewage Treatment Plant.

An early evaluation of the sewer line reveals that portions of the sewer line are under high embankments while other portions are under low embankments with minimal fill over the pipe. Due to future widening of the freeway, the frontage road must be constructed on new embankment, which is typically 10-20 feet above existing ground. The new embankment will cover areas of the sewer line. Portions of the sewer line were constructed to withstand embankments of this depth. In other areas it is uncertain if the same construction methods were followed. During final design the pipe bedding will need to be investigated to determine what construction methods were used when the sewer line was constructed. At that time if it is determined that the sewer line needs to be protected a concrete slab can be placed over the top of the sewer line to distribute the loads. Manholes will need to be raised to accommodate the additional embankment. During the process of coordinating with the City of Glendale it was discussed with city staff about relocating the sewer line or possibly upgrade/upsize the line at the same time. The City did not have a need

to upgrade the line and did not have funding available for sewer relocation, therefore this option has been eliminated. As part of the project, sewer stubouts will be provided to the right of way for the undeveloped property to the west of the Frontage Road.

The horizontal alignment of the frontage road was established to maintain a 40 foot clearance from the outside freeway travel lane. This provides adequate space for freeway shoulder distance to the access control fence and corridor for the sewer line. The sewer manholes lie between the inside curb of the frontage road and the access control fence. It is acceptable for the sewer manholes to be located in one lane. For maintenance purposes one lane could be closed while allowing traffic to continue in the other lane.

The frontage road profile is generally controlled by the 100-year flood event in New River. A review of Middle New River Watercourse Master Plan, FCDMC May 2000, generated a profile of the river's high water elevation plus two feet of freeboard. A comparison of the high water elevation to the existing freeway profile was made. The frontage road profile closely matches the freeway elevations to produce a nearly flat ground between the freeway widening and the frontage road. All embankments needed for future widening of southbound SR 101L will be constructed as part of this project with the frontage road.

The frontage road is typically in a curve and is superelevated with curb and gutter on both sides. Pavement drainage will be collected in catch basins and conveyed through a lateral culvert that crosses the frontage road.

The intersection of the frontage road with Beardsley Road is typical for both Alterative No. 1 and Alternative No. 2. The 2-lanes of eastbound Beardsley Road traffic will have a free-flow condition onto the southbound frontage road. The 2-lanes of southbound frontage road traffic approaching Beardsley will have a free-flow condition onto westbound Beardsley Road. At the intersection the roadway will widen to 3-lanes approaching Beardsley allowing the center lane to either take Beardsley or continue on the frontage road. The frontage road will continue with 2-lanes though the Beardsley intersection and combine with the 2-lanes from Beardsley south of the intersection to create a 4-lane section. The 4-lanes will continue until the new on-ramp where two lanes will be designated for the ramp and two lanes will continue on the frontage road.

3.2.6 Alternative No. 1

This alternative is based on the premise of maintaining the ramp configuration at 75th Avenue and Union Hills as they exist today. The new southbound frontage road would be constructed between the 75th Avenue on-ramp and the Union Hills off-ramp. (Figure 3.1)

The south end of the southbound entrance ramp at 75th Avenue will be reconstructed to accommodate future widening of SR 101L. The east end of the ramp at 75th Avenue will be maintained except for widening to the north for the frontage road. Traffic volumes indicate a need for two-lanes on the frontage road in the vicinity of the Beardsley Channel. Subsequent development and evaluation of various geometric alignments of a two-lane frontage road failed to eliminate a

conflict with the Beardsley Channel. This required enclosing Beardsley Channel and will involve the construction of a double 8x6 concrete box culvert that will provide adequate capacity to convey the design-year flows.

Early in project development, the City of Peoria was approached by the Church of Joy, who owns property in the northwest quadrant of SR 101L and 75th Avenue, to accommodate access from the frontage road. Access at this location will require a crossing the Beardsley Channel and constructing a double 8'x6' concrete box culvert for the width of the access. An access at this point would require applying for a permit through the City of Glendale and approval from ADOT on the access location. The approval will be granted through the permit process after this project is constructed. A right-turn lane from the frontage road to the new access may be required as a condition of the permit for access onto the frontage road.

Once the frontage road gets past the turn in the Beardsley Channel, it is widened to three lanes, developing a right turn only lane to westbound Beardsley Road. The inside lane is a through lane on the frontage road. The middle lane has the option of continuing through on the frontage or right onto Beardsley Road.

Between the Beardsley Road intersection and Union Hills Drive, the original concept was to relocate the southbound exit ramp to the north and merge the frontage road with the exit ramp. This would occur prior to the lane split for the U-Turn. A review of initial traffic volumes and discussion with ADOT resulted in rejecting this concept. The volume of traffic and desired lane assignments created the majority of vehicles were weaving once they exited the freeway. Due to this issue a braided ramp was proposed to separate the traffic movements. The south end of the frontage road for Alternative No. 1 is as follows.

South of the Beardsley Road intersection, the frontage road is four lanes wide. A lane drop reduces it to three lanes. The southbound exit ramp to Union Hills Drive is reconstructed to accommodate future widening of SR101. The existing alignment will shift slightly from its current location and profile grade will maintain the existing vertical sag at the gore of the existing ramp. The single lane "U-Turn" road then splits from the frontage road and crosses over the exit ramp at the sag point. This will minimize the overall height of the "U-Turn" roadway in relation to Union Hills Drive and adjacent properties. The frontage road will merge with the exit ramp traffic. The U-Turn Road parallels SR 101 between the freeway and the exit ramp after it crosses the ramp and is on embankment fill with retaining walls. The braided ramp configuration provides a safe flow of traffic, separating ramp traffic from U-Turn traffic.

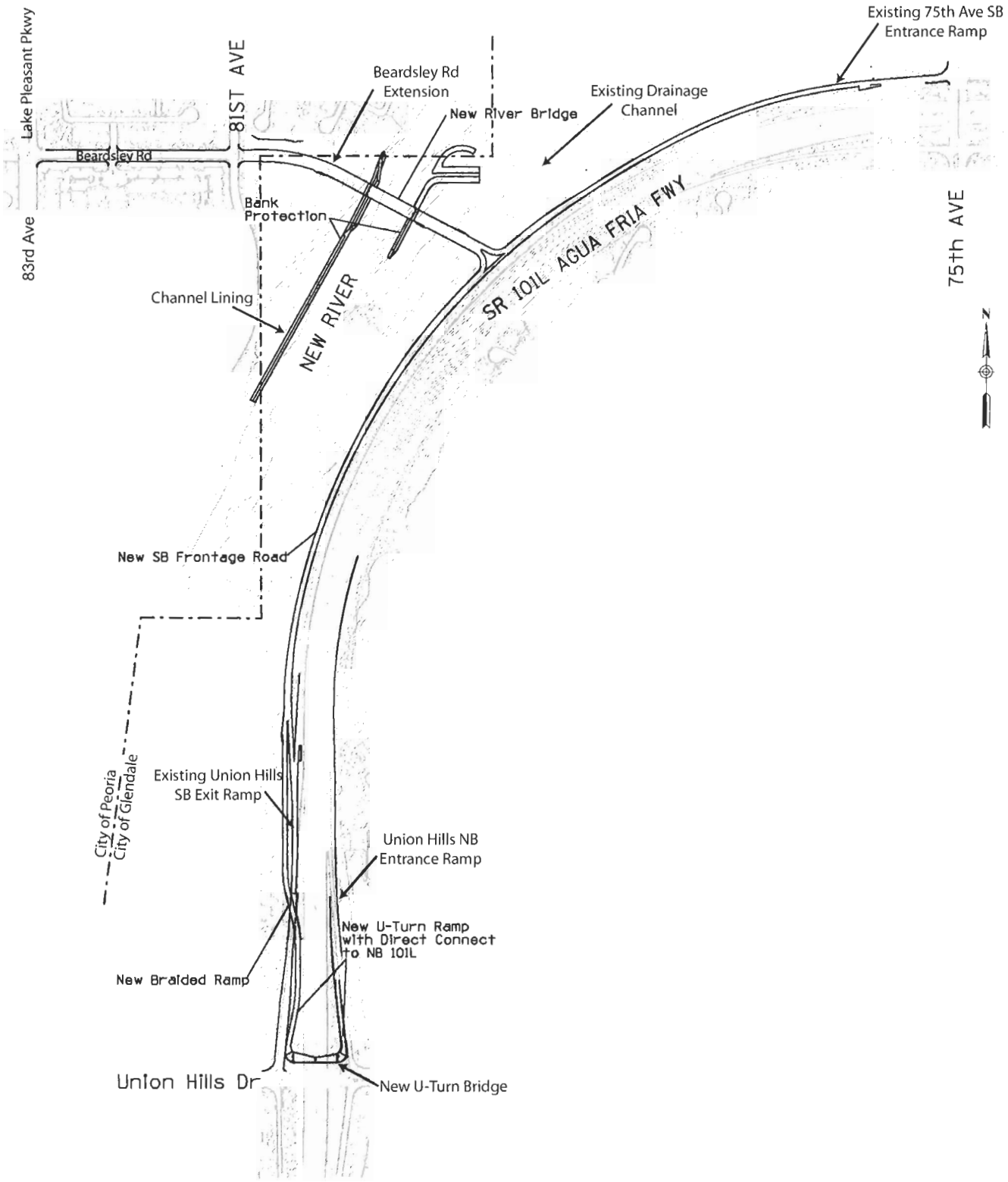


Figure 3.1
Alternative 1 - Overall Plan

Advantages to Alternative No. 1:

- The interchanges within the project limits will remain the same. Drivers will be familiar with the existing configuration.
- Motorist traveling from 75th Avenue will have quicker access to southbound SR 101L.
- Motorist will have a direct off-ramp to Union Hills from southbound SR 101L.
- Connects pedestrian access in the area.
- The braided ramp separates vehicle movements to and from SR101L.

Disadvantages to Alternative No. 1:

- The distance to widen for the Union Hills intersection and the storage available for vehicles at the intersection is limited by the distance between the intersection and the braided ramp structure.
- Conflicts between the frontage road and Beardsley Channel require conversion of the channel to a concrete box culvert for a distance of approximately 1,600 feet at an added cost of approximately $4,000,000.
- Southbound traffic on SR 101L accessing westbound Beardsley Road must exit the freeway east of 75th Avenue and travel through the 75th Avenue intersection. Also, eastbound traffic on Beardsley Road accessing southbound SR 101L must enter the freeway south of Union Hills Drive and travel through the Union Hills Drive intersection. Therefore, the majority of Beardsley Road traffic must travel through these two intersections that are currently congested. In effect, the operational characteristics of these two intersections decrease with the construction of the Beardsley Road extension as per Alternative No. 1.

3.2.7 Alternative No. 2

There were concerns with Alternative No. 1 regarding Beardsley Road traffic having to travel through the intersections at 75th Avenue and Union Hills Drive. Alternative No. 2 will reconfigure the 75th Avenue SB on-ramp and the Union Hills SB off-ramp. This will eliminate the need for Beardsley traffic to travel through the 75th Avenue intersection going to Beardsley Road or the Union Hills intersection to enter SR 101L. (Figure 3.2)

The westbound auxiliary lane between 67th Avenue and 75th Avenue on SR 101L will be extended westerly under the 75th Avenue Bridge. A new exit ramp will convey southbound traffic to the frontage road. The frontage road from 75th Avenue to the new off-ramp will be two lanes then merge to one lane prior to the new exit ramp. The new off-ramp will converge with the frontage road and become two lanes, eliminating the need to merge traffic. The two-lane frontage road will be situated between the widened SR 101L and the Beardsley Channel. This can be accomplished because of the elimination of the southbound entrance ramps at this location.

Once the frontage road passes the turn in the Beardsley Channel, it is widened to three lanes on the inside. The inside widening will reduce the weaving movements between the new off-ramp and the Beardsley intersection. The three

lanes will include a right turn only lane to westbound Beardsley Road in the outside, the inside lane is a through lane on the frontage road, and the middle lane will be an option of continuing through on the frontage or right onto Beardsley Road.

South of the Beardsley Road intersection the frontage road splits. The left 2-lanes continue onto a new southbound entrance ramp while the right 2-lanes continue on as the frontage road. There is sufficient weave distance between the Beardsley Road intersection and the entrance ramp for this lane configuration.

The frontage road will continue south toward Union Hills Drive. A left exit will develop the "U-Turn" Road. Two lanes will then widen to four lanes as the frontage road approaches Union Hills Drive.

Advantages of Alternative No. 2

- Reconfiguring the ramps will eliminate Beardsley Road traffic from mixing with the 75th Avenue and Union Hills Drive traffic. This will result in the 75th Avenue and Union Hills Drive traffic interchanges having lower traffic volumes and improved operation characteristics than for Alternative No. 1. These two interchanges will operate at a Level of Service of C or better through the year 2030.
- Left exit from frontage road to "U-Turn" is preferable over a right exit. The upstream lane assignments are what the driver would expect, the left lane will go to the "U-Turn" on the left and right lane(s) go to Union Hills Drive.
- Alternative No. 2 provides more than adequate storage at the Union Hills intersection.
- Connects pedestrian access in the area.

Disadvantages of Alternative No. 2

- The ramp reconfiguration will require Southbound 101 traffic accessing Union Hills Drive to exit just west of 75th Avenue and travel along the frontage road. While the travel distance is almost the same as the existing conditions, the travel time is increased.
- Additional signage will be required for southbound 101 traffic. This configuration is also a change in driver expectancy. The frontage road will function like a collector distributor for Beardsley Road and Union Hills Drive.
- The four lanes on the frontage road south of the Beardsley road intersection requires a weave of two lanes, which requires extra length of 4-lane pavement .

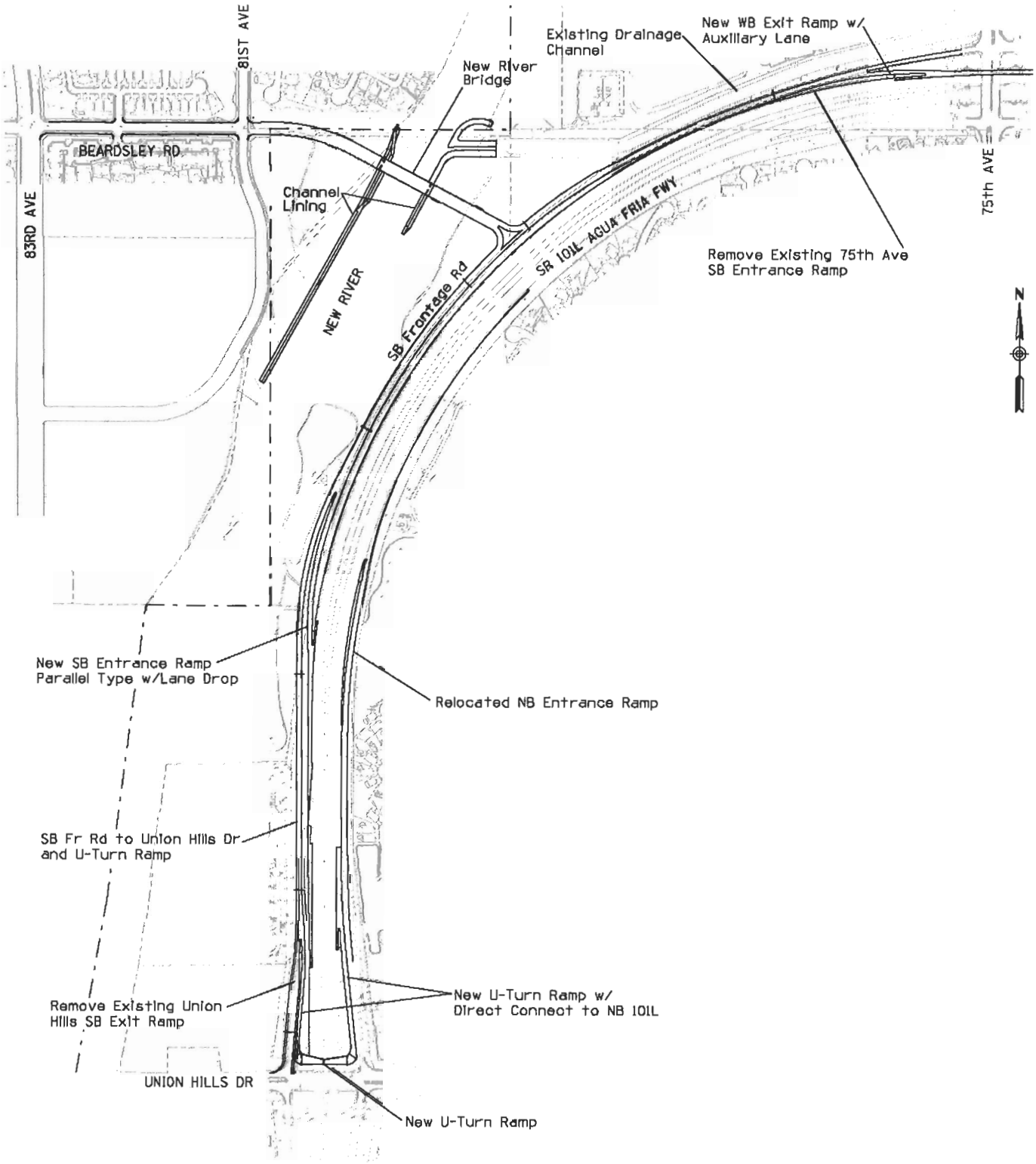


Figure 3.2
Alternative 2 (Recommended Alternative)
Overall Plan

3.2.8 No Build

The No Build Alternative will make no improvements to the area. Traffic congestion will continue to increase and traffic operations will continue to get worse at the 75th Avenue interchange and the Union Hill Drive interchange. Traffic volumes on Deer Valley Road are projected to increase over 200% by the year 2030. This will equate to additional congestion at 75th Avenue and Deer Valley in addition to the 75th Avenue interchange. Widening of the major arterials leading to 75th Avenue would be warranted along with intersection improvements to increase the capacity of the turning movements. Union Hills traffic would increase by approximately 60%. There is limited area to widen the roadway on Union Hills within the project study area. Widening is a potential, but right of way impacts would occur. During peak hours Union Hills would be congested and in grid lock. Widening the Union Hills interchange would provide additional relief specifically at the interchange. As the Union Hills and 75th Avenue interchanges experience more congestion motorist would travel to less congested interchanges such as Bell Road or 67th Avenue. The arterial roadways leading to these interchanges would experience additional volume and could warrant improvements and widening.

3.3 Conclusions

The purpose of the project is to improve the traffic operations and safety for the existing connections to SR 101L at Union Hills and 75th Avenue by providing an additional connection from Beardsley Road. Alternative 1 does not accomplish the purpose of the project. It requires vehicles to travel through the intersections at 75th Avenue and Union Hills Drive. This will create additional congestion at these two locations. In addition there are significant impacts to the Beardsley Channel that would require an estimated $4,000,000 to bridge the channel.

Alternative 2 is the recommended alternative to continue with for final design. This alternative will remove the Beardsley Road traffic from the 75th Avenue and Union Hills Drive intersections satisfying the purpose and need of the project. In addition there is sufficient weaving distance for vehicles to align themselves in the proper lane eliminating the need for a braided ramp north of Union Hills Drive.

4.0 TRAFFIC

Beardsley Road, east of 83rd Avenue is designated as a major arterial with a 90-foot right of way, two (2) lanes each direction, and one (1) two-way-left-turn-lane. It has been designated with access at mile, ½ mile and possibly ¼ mile. Access to abutting land is secondary to accommodating through traffic but may be balanced with the needs to develop land uses. Between 83rd Avenue and 81st Avenue along Beardsley Road there are residential developments on both sides of the roadway. On the north side of the roadway there is single family housing and on the south side there is an apartment complex. Beardsley Road comes to an end at 81st Avenue with a T-intersection. There is a vacant parcel directly to the east and single family housing to the north east of the intersection. New River crosses in a northeastern to southwestern direction approximately 800-feet east of the 81st Avenue and Beardsley Road intersection. One

thousand feet to the east is SR 101L. There are diamond interchanges at 75th Avenue and Union Hills Drive. Currently there is no frontage road between these two interchanges.

4.1 Existing Conditions

West of 83rd Avenue on Beardsley Road the roadway is a five lane section. There are 2-through lanes in the westbound direction, 1-through lane in the eastbound direction with a left turn lane and a right turn lane. The travel lanes carry through the signalized intersection with one eastbound and two westbound in addition to a left turn lane. The roadway width is 64-feet and has curb and gutter on both sides. There are 6-foot meandering sidewalks on each side of the roadway.

South of the 83rd Avenue and Beardsley Road intersection the pavement width is 105-feet. This accommodates 3 southbound through lanes, 2 northbound through lanes, and a left and right turn lane. Currently, there is a painted median that extends south to Oraibi Drive where it changes to a raised median. On the north side of the intersection there are two through lanes in each direction, with a left turn lane and raised median island. The east curb lines up with the southern leg, while the west curb line is offset by 5-feet.

The 82nd Avenue intersection is located approximately 400-feet east of the 83rd Avenue intersection. 82nd Avenue leads directly into a residential neighborhood to the north and has a roadway width of 38-feet. East of 82nd Avenue, Beardsley Road is only one lane in the westbound direction. It diverges to two lanes west of 82nd Avenue, which is delineated with striping even though there is sufficient pavement width to maintain 2-lanes. Directly across from 82nd Avenue is an entrance to Sonoma Ridge Apartments.

Continuing to the east approximately 600-feet Beardsley comes to a T-intersection, which is 81st Avenue to the north and Oraibi Drive to the south. There is one through lane in the westbound direction and a left and right turn lane in the eastbound direction. There are stop signs at each leg of the intersection. The curb, gutter and sidewalk continue both north and south on each side of the road. 81st Avenue and Oraibi Drive are striped for a 3-lane section for both the north and south leg with a roadway width of 46-feet. There is 1-through lane in each direction with a continuous left turn lane.

4.2 Existing Traffic Volumes

Traffic volumes were collected along the corridor within the project limits. Turning movements were recorded in addition to AM and PM peak traffic volumes. Existing Peak Hour Volumes are shown in Figure 4.1 and existing Average Daily Traffic Volumes are shown in Figure 4.2.

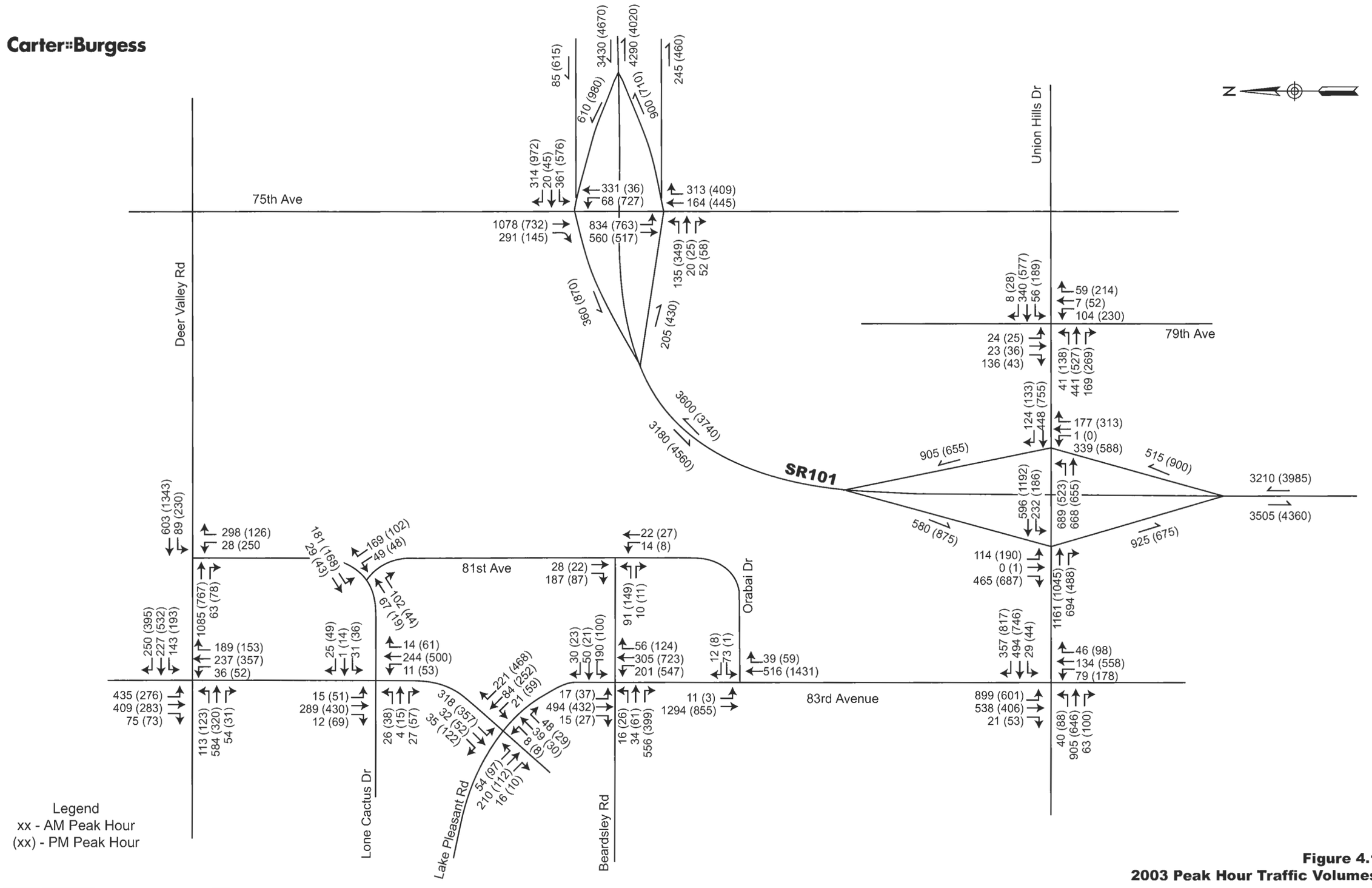


Figure 4.1
2003 Peak Hour Traffic Volumes

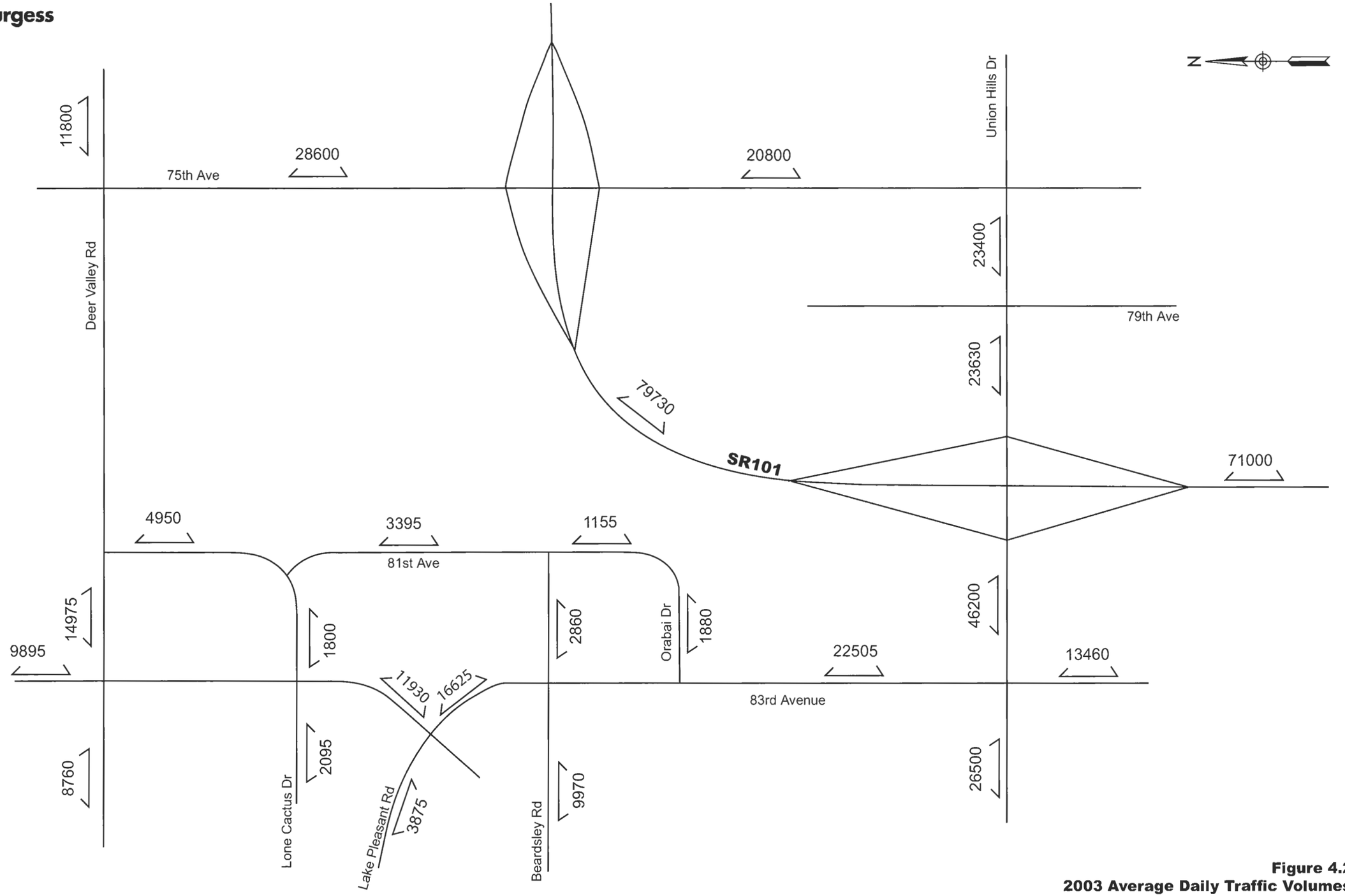


Figure 4.2
2003 Average Daily Traffic Volumes

4.3 Operational Characteristics

Currently the SR 101L interchanges at Union Hills and 75th Avenue are congested during the AM and PM peak hours. As traffic volumes increase the operational efficiency will continue to decrease at these two locations. A large percentage of the traffic entering these two locations is coming from the area Northeast of SR 101L. This project proposes to reconfigure the ramps at 75th Avenue and Union Hills to better accommodate traffic flows. A new off-ramp will be constructed directly west of 75th Avenue that will service vehicles traveling to Beardsley and Union Hills. This will eliminate the need for vehicles traveling to Beardsley to enter into the 75th Avenue intersection which is already congested. Union Hills traffic will also be exiting at this location because the existing off-ramp will be removed to construct a new on-ramp for Beardsley and 75th Avenue traffic. Again, traffic coming from Beardsley will be able to access SB SR 101L without entering the Union Hills intersection.

The U-Turn structure proposed just north of Union Hills will provide direct access to NB SR 101L. Vehicles coming from Beardsley Road can access the freeway without entering the Union Hills intersection. There will be a designated on-ramp for the U-Turn traffic that will enter the freeway prior to the Union Hills traffic. See Figure 3.3 for layout.

4.4 Planned Improvements

Residential development is currently on both sides of Beardsley Road between 83rd Avenue and 81st Avenue. The access is already established and it is not likely there will be additional access included within this area. The southeast quadrant of 81st Avenue and Beardsley Road is an undeveloped 9-acre parcel. The City of Peoria has expressed interest in developing a trailhead at this location. The trailhead will be developed on a minimal 3-acre site south of the Beardsley Road intersection. There is potential for a development on the remaining 6-acre parcel. Access to the development site will need to go through the normal permitting process with the City of Peoria at the time of development.

With the improvements to Lake Pleasant Parkway, the significant growth in population, and employment associated with new development in the area, prior studies have shown (and have been corroborated in this report) that the new traffic from developments will continue to increase and congest SR 101L traffic interchanges at 75th Avenue and Union Hills Drive. These two interchanges will operate at a lower Level of Service and result in traffic diverting to other traffic interchanges in the area, like 67th Avenue and Bell Road. The result could lead to the need for improvement at all four interchanges as well as the arterial roadway leading to these interchanges.

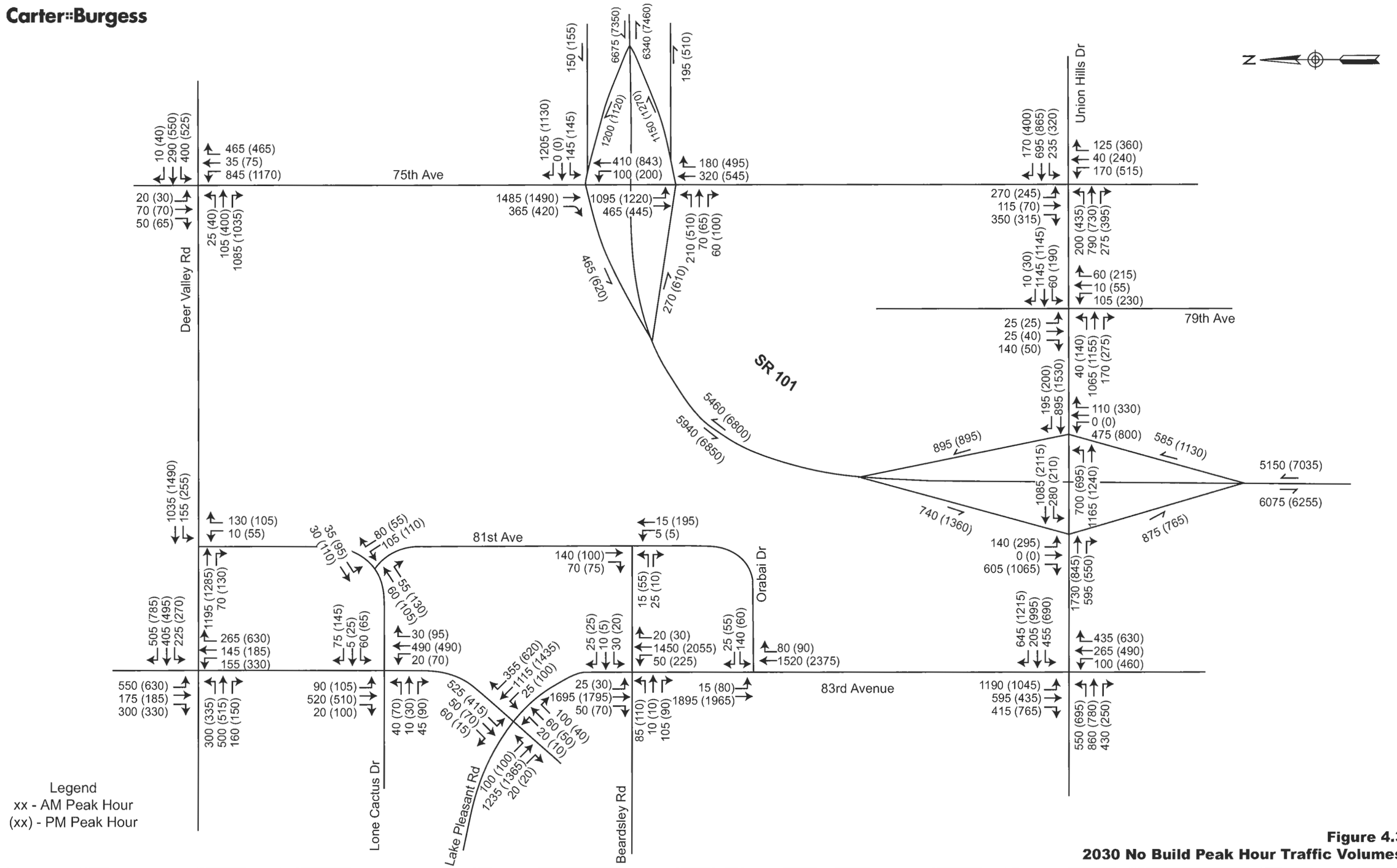
In order to accommodate the increased traffic volumes, provide good arterial mobility and enhance vehicle and pedestrian safety, an additional access to SR 101L within this area is warranted.

4.5 Volume – Capacity Analyses

Traffic volumes were projected to the year 2030. The Maricopa Association of Governments (MAG) model was used to establish the projected volumes. During the development of this project, MAG revised their model. An analysis was complete for

Alternative 1 prior to MAG revising the model. A new analysis was developed utilizing the new model. The results of the new model resulted in lower traffic volumes and in some cases there was no traffic on at least one link. This caused some suspicion with the new model. A validation was completed on the new model results and adjustments were made. The revised traffic projections were presented to decision level staff from the cities of Peoria and Glendale and consensus was reached as to the reasonableness of the revised 2030 volumes.

2030 Peak Hour Volumes using the adjusted MAG traffic volumes are shown in Figure 4.3 and 2030 Average Daily Traffic Volumes using the adjusted MAG traffic volumes are shown in Figure 4.4. These two figures represent the No Build Alternative. Figure 4.5 and Figure 4.6 represent 2030 traffic volumes for Alternative 2 the recommended alternative. Projected volumes represented are the adjusted MAG traffic volumes. Figures 4.7 and 4.8 represent the 2030 traffic volumes for Alternative 1.



Legend
xx - AM Peak Hour
(xx) - PM Peak Hour

Figure 4.3
2030 No Build Peak Hour Traffic Volumes

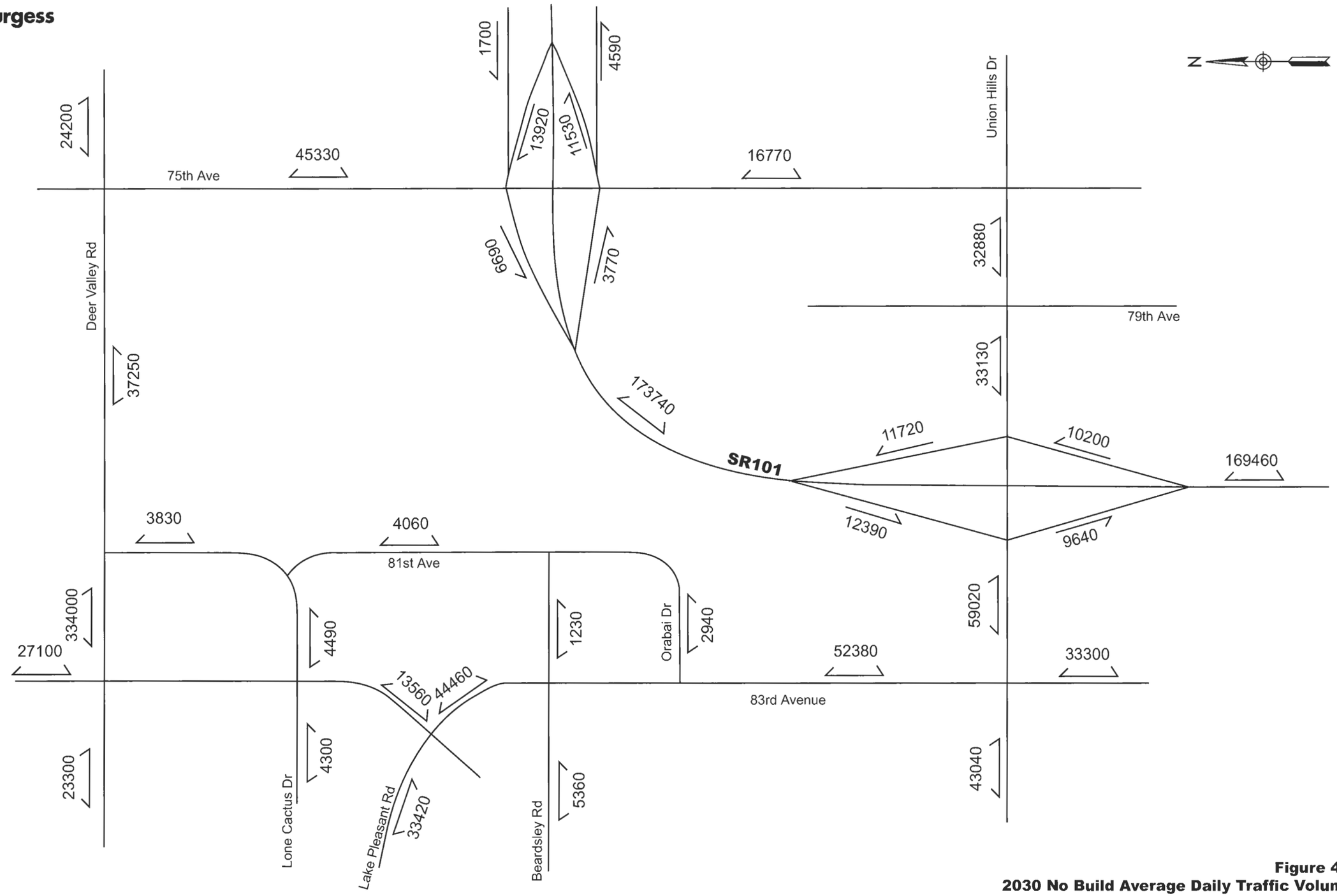
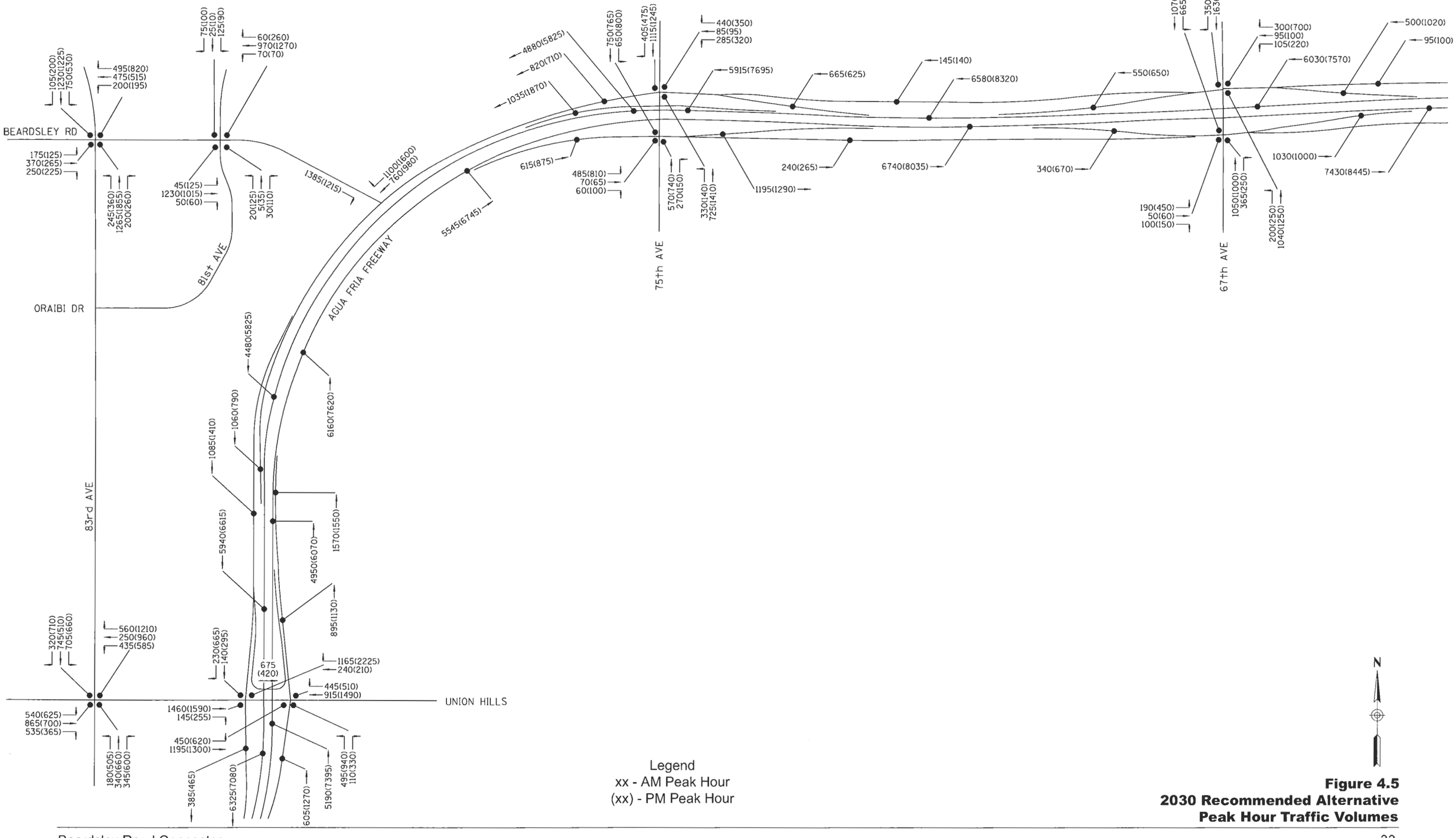
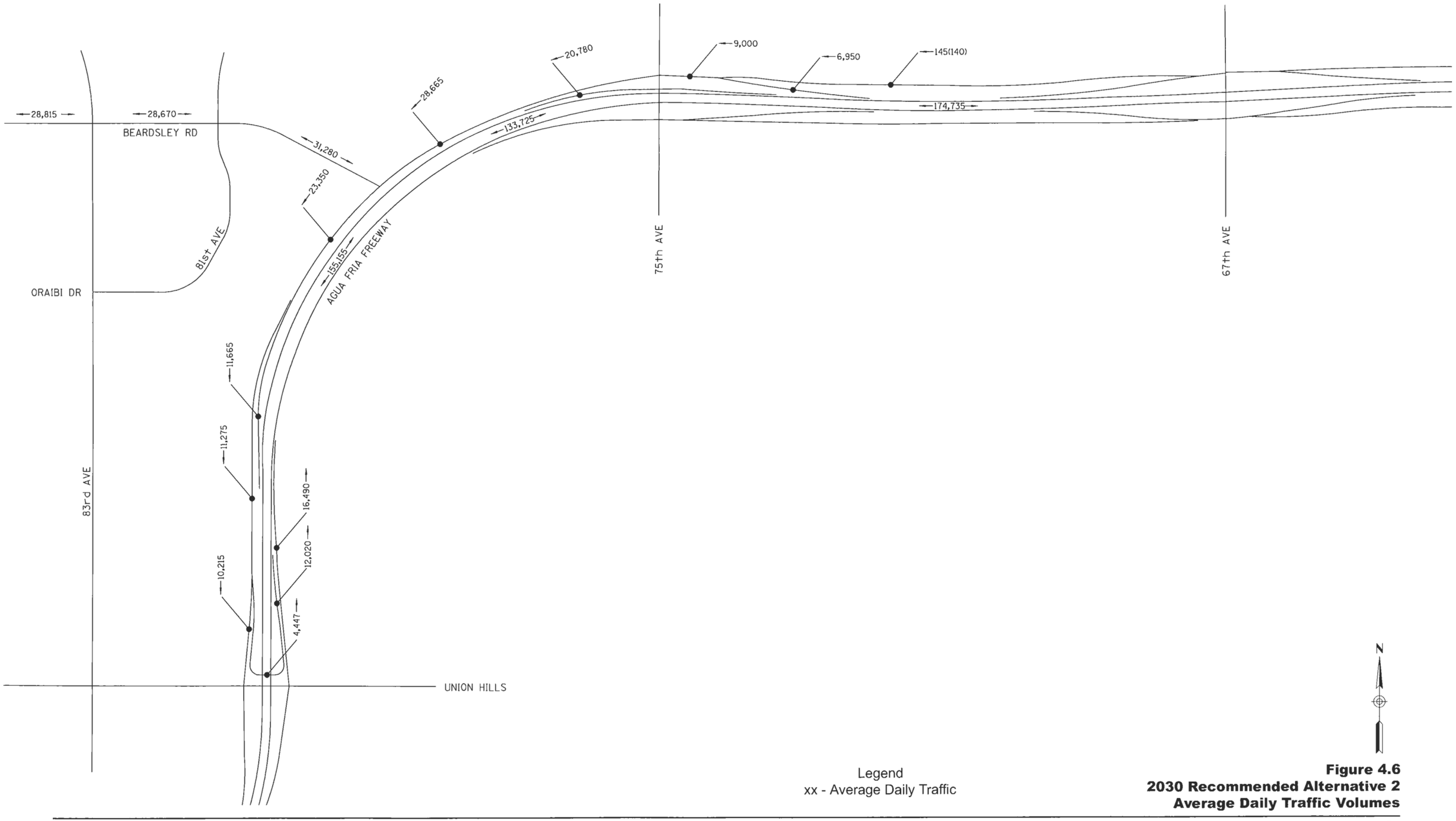


Figure 4.4
2030 No Build Average Daily Traffic Volume



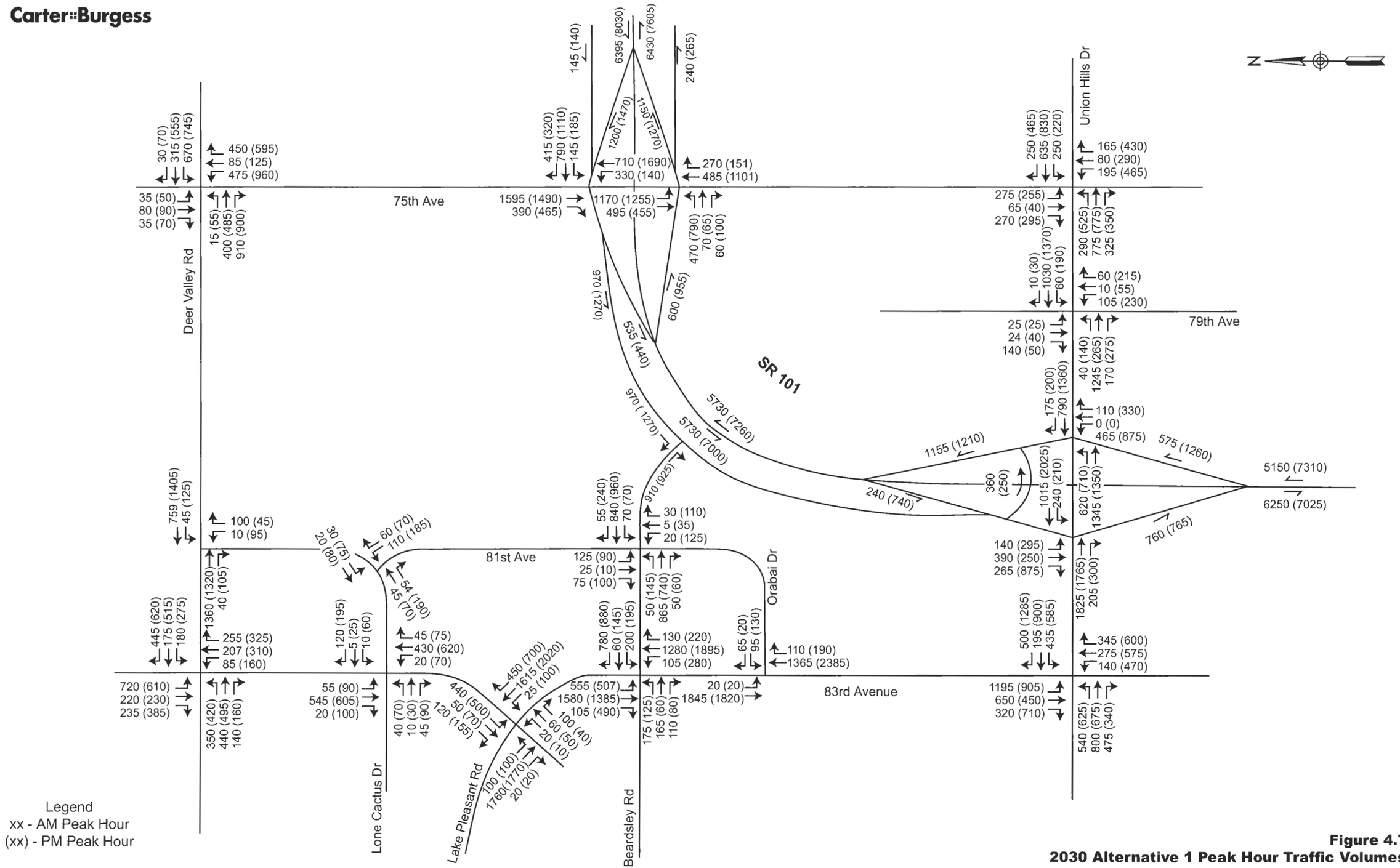
Legend
xx - AM Peak Hour
(xx) - PM Peak Hour

Figure 4.5
2030 Recommended Alternative
Peak Hour Traffic Volumes



Legend
xx - Average Daily Traffic

Figure 4.6
2030 Recommended Alternative 2
Average Daily Traffic Volumes



Legend
xx - AM Peak Hour
(xx) - PM Peak Hour

Figure 4.7
2030 Alternative 1 Peak Hour Traffic Volumes

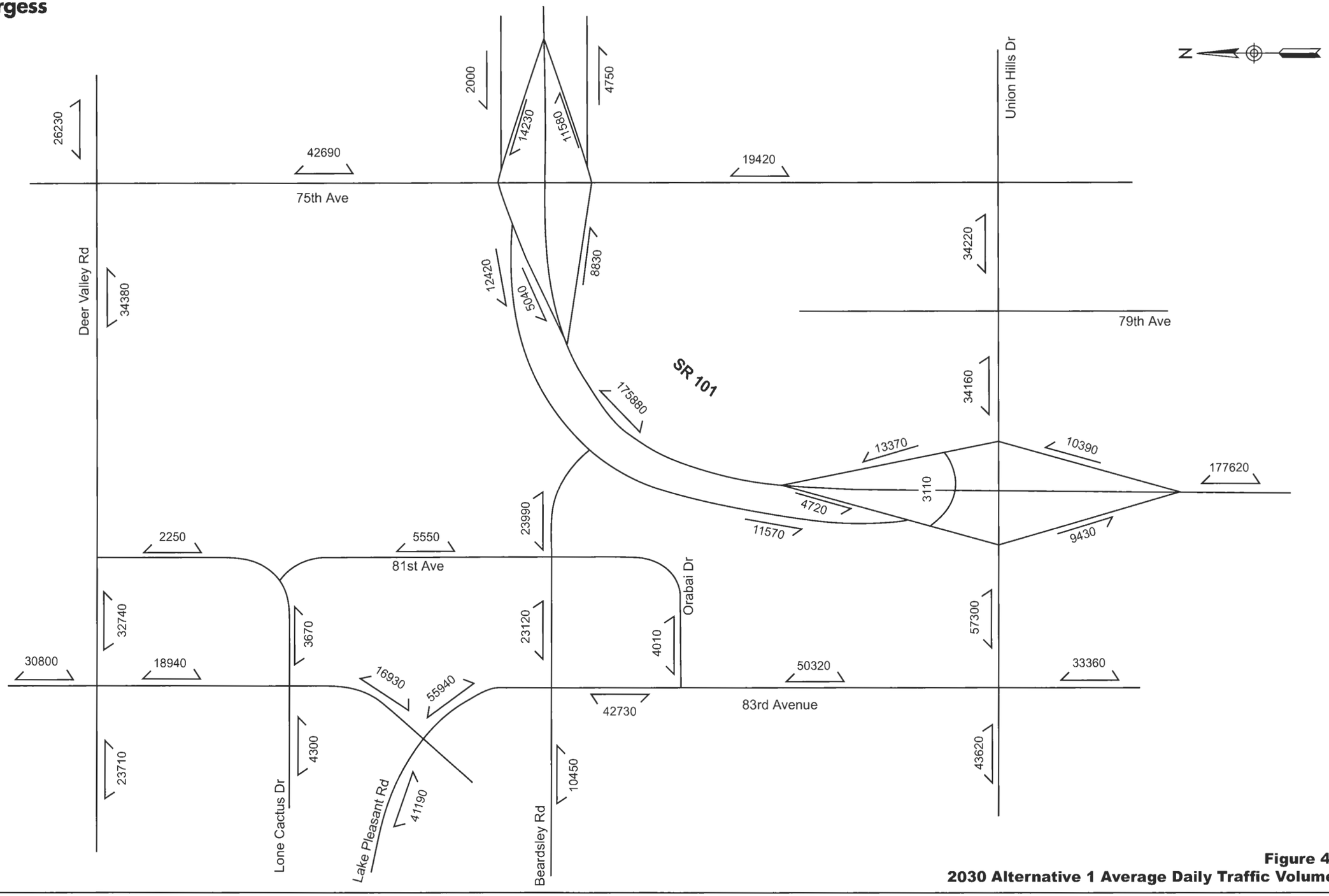


Figure 4.8
2030 Alternative 1 Average Daily Traffic Volumes

4.5.1 Beardsley Rd Extension

Traffic that will be utilizing the Beardsley Connector will predominately be traveling from the northwest area. A high volume of vehicles will be traveling south on Lake Pleasant Parkway to Beardsley to access SR 101L. There are heavy left turns at this intersection, and conversely in the opposite direction there is a high volume of right turns onto Lake Pleasant Parkway. This will warrant dual southbound left turn lanes on Lake Pleasant Parkway and dual westbound right turn lanes on Beardsley Road.

While the right turn volumes on westbound Beardsley Road at 81st Avenue justify a turn lane, it is not recommended. Provision of a right turn lane might encourage traffic to cut through on 81st Avenue. Cut through traffic has been a concern with local residents. As a deterrent traffic calming devices will be proposed with this project. A more detailed discussion will be in Section 4.5.5.

4.5.2 Frontage Rd

The southbound frontage road will be a minimum of 2-lanes. As it approaches Beardsley Road it will widen to 3-lanes. There will be 2 free flow right turn lanes onto Beardsley Road. The middle lane will also have the option to continue south on the frontage road along with the inside lane. As the two lanes continue past Beardsley, two additional lanes will merge from the Beardsley Connector creating a 4-lane section. It will continue 4-lanes until the new on-ramp where 2-lanes will be designated for the on-ramp and the outside 2-lanes will continue on the frontage road. South on the frontage road the inside lane will split from the frontage road to the U-turn bridge for northbound SR 101L.

There are several areas where lanes merge on the frontage road. In addition, the roadway section varies from 2-lanes to 4-lanes. Weaving distances were very critical during the development of these alternatives. Vehicles may need to maneuver one and sometimes two lanes to get into the proper lane assignments. Proper signing will be critical to alert motorist, but even more important is the proper weave distances. Figure 3.9 and Figure 3.10 show the weave analysis conducted for both the AM peak hour and PM peak hour.

4.5.3 SR 101L Ramps

The reconfiguration of the southbound ramps will improve the operations of the 75th Avenue intersection and the Union Hills Drive intersection. The new Beardsley Road/Union Hills Drive off-ramp will be located just west of the 75th Avenue Overpass. There is an existing auxiliary lane from 67th Avenue to 75th Avenue. This auxiliary lane will be extended to the new off-ramp. This will allow vehicles to merge out of the through traffic well in advance of the exit.

4.5.4 Weave and Merge / Diverge Analysis

A Microscopic Traffic Simulation model for the Alternative 2 Scenario was developed using the CORSIM 5.1 software. This microscopic model was used to determine the level of service at the various merge, diverge and weave locations in the study area for both AM and PM peak hours.

Under the Alternative 2 Scenario four different cases with different ramp merge configuration, with/without ramp metering were evaluated. The different cases are discussed below.

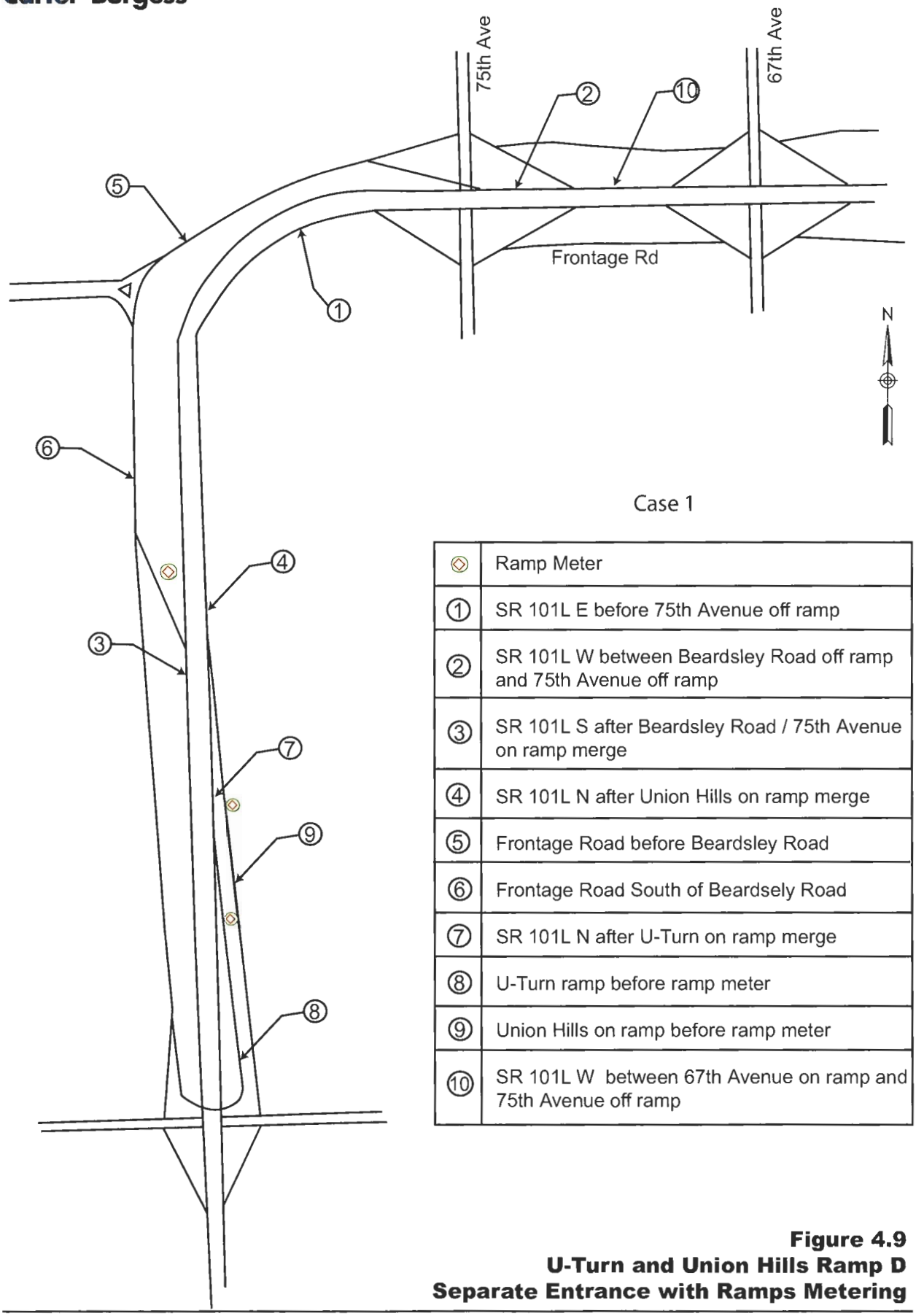
Five separate CORSIM simulation files were run for AM and for PM peak hour for each of the four different cases discussed below to get the average level of service.

Case 1: The U-Turn ramp and the ramp from Union Hills (to northbound SR 101L) have separate on ramps to connect to the SR 101L N with Ramp Metering. The ramp from Frontage Road (Southbound) to SR 101L S is also Ramp Metered. The locations where the level of service was calculated from CORSIM files is shown in Figure 4.9. These results are tabulated in Table 4.1 for AM peak and Table 4.2 for the PM peak hours.

Case 2: This scenario is same as Case 1 but without any Ramp Metering. Figure 4.10 shows the locations where the level of service was obtained from the CORSIM simulations. The results for Case 2 are tabulated in Table 4.3 for AM Peak and Table 4.4 for PM Peak hours.

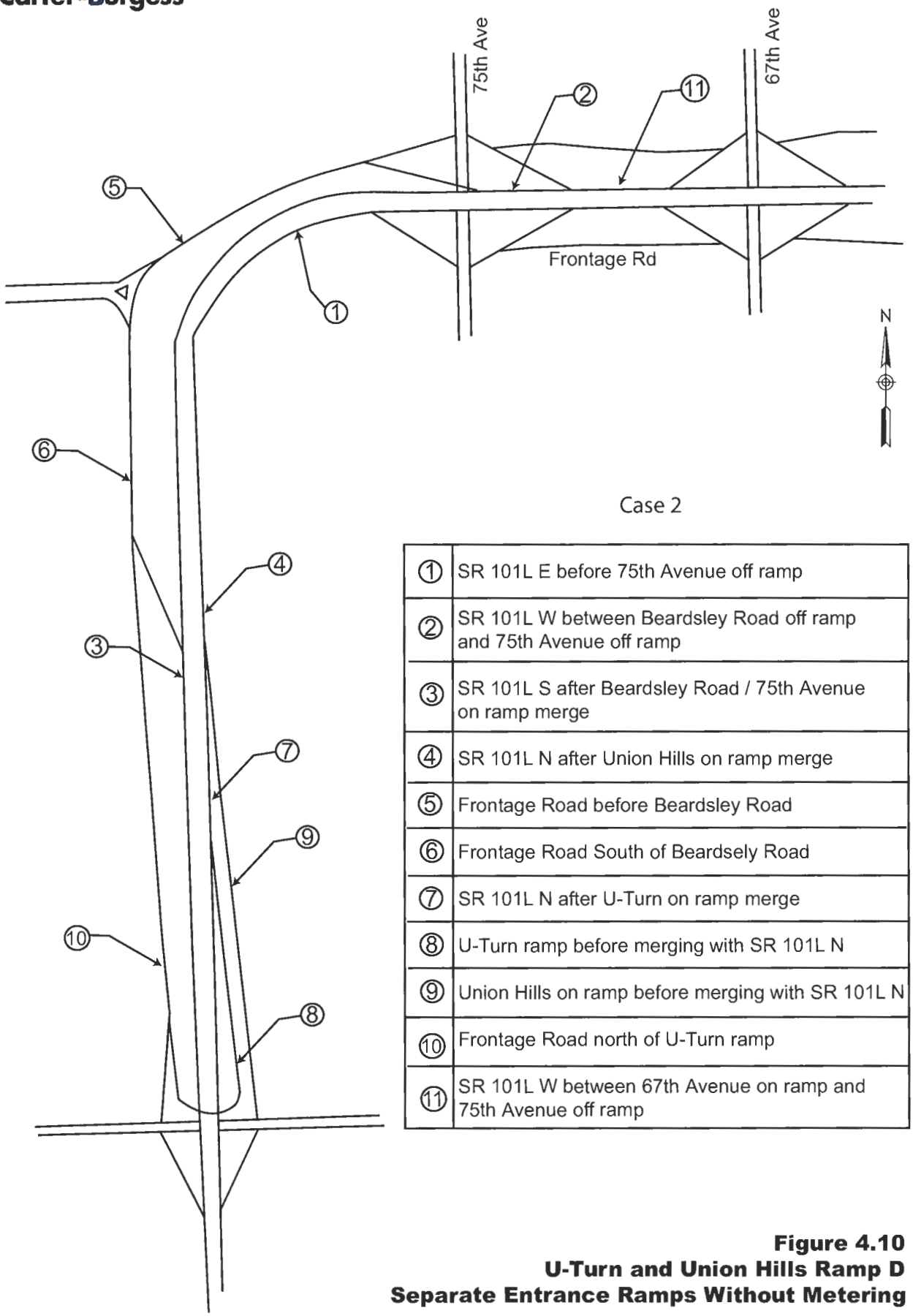
Case 3: The U-Turn ramp and the ramp from Union Hills (to northbound SR 101) have separate on ramps to connect to the SR 101L N with Ramp Metering. The ramp from Frontage Road (Southbound) to SR 101L S is also Ramp Metered. The locations where the level of service was calculated from CORSIM files is shown in Figure 4.11 These results are tabulated in Table 4.5 for AM peak and Table 4.6 for the PM peak hours.

Case 4: This scenario is same as Case 3 but without any Ramp Metering. Figure 4.11 shows the locations where the level of service was obtained from the CORSIM simulations. The results for Case 4 are tabulated in Table 4.7 for AM Peak and Table 4.8 for PM Peak hours.



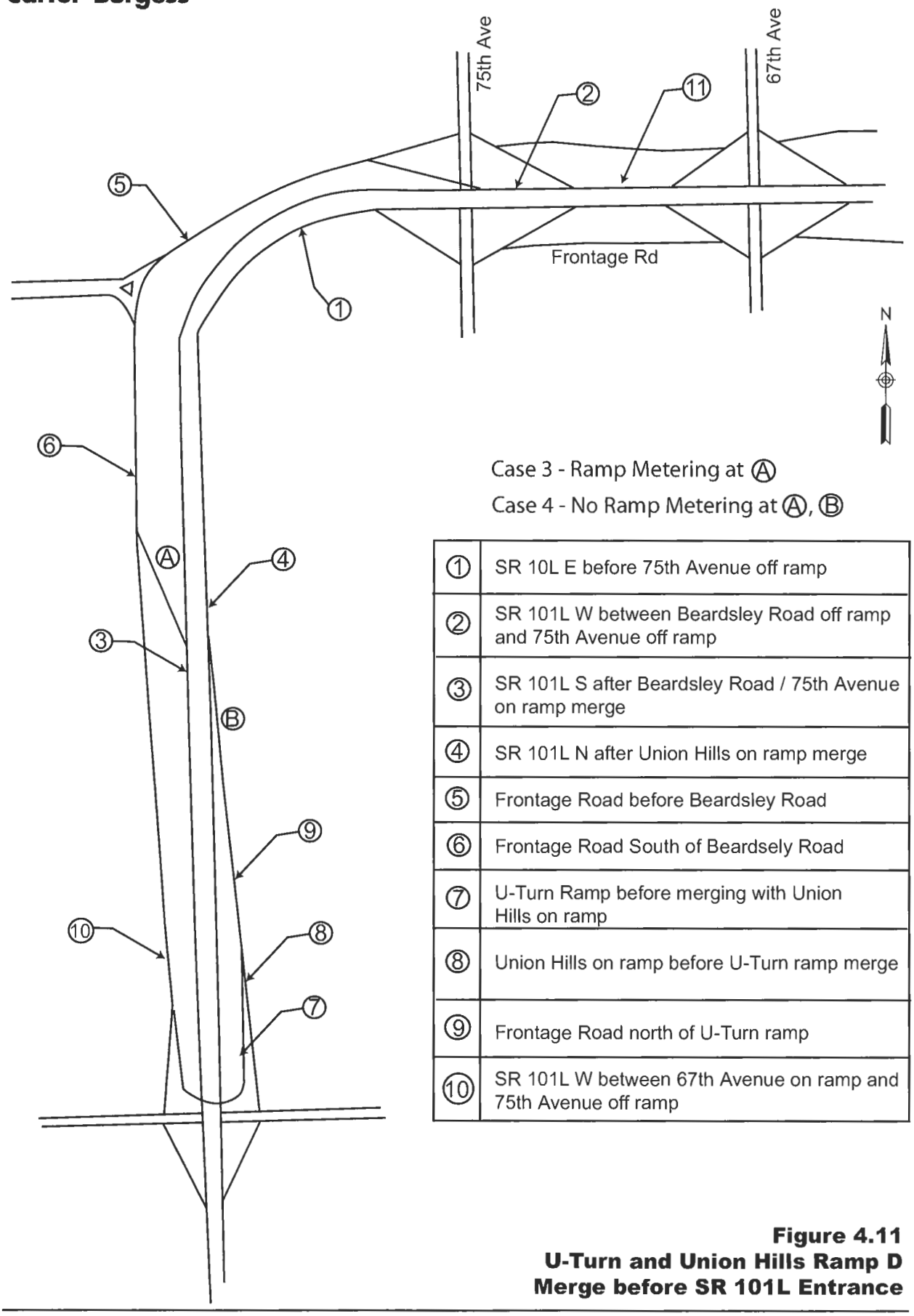
◇	Ramp Meter
①	SR 101L E before 75th Avenue off ramp
②	SR 101L W between Beardsley Road off ramp and 75th Avenue off ramp
③	SR 101L S after Beardsley Road / 75th Avenue on ramp merge
④	SR 101L N after Union Hills on ramp merge
⑤	Frontage Road before Beardsley Road
⑥	Frontage Road South of Beardsely Road
⑦	SR 101L N after U-Turn on ramp merge
⑧	U-Turn ramp before ramp meter
⑨	Union Hills on ramp before ramp meter
⑩	SR 101L W between 67th Avenue on ramp and 75th Avenue off ramp

Figure 4.9
U-Turn and Union Hills Ramp D
Separate Entrance with Ramps Metering



①	SR 101L E before 75th Avenue off ramp
②	SR 101L W between Beardsley Road off ramp and 75th Avenue off ramp
③	SR 101L S after Beardsley Road / 75th Avenue on ramp merge
④	SR 101L N after Union Hills on ramp merge
⑤	Frontage Road before Beardsley Road
⑥	Frontage Road South of Beardsely Road
⑦	SR 101L N after U-Turn on ramp merge
⑧	U-Turn ramp before merging with SR 101L N
⑨	Union Hills on ramp before merging with SR 101L N
⑩	Frontage Road north of U-Turn ramp
⑪	SR 101L W between 67th Avenue on ramp and 75th Avenue off ramp

Figure 4.10
U-Turn and Union Hills Ramp D
Separate Entrance Ramps Without Metering



①	SR 10L E before 75th Avenue off ramp
②	SR 101L W between Beardsley Road off ramp and 75th Avenue off ramp
③	SR 101L S after Beardsley Road / 75th Avenue on ramp merge
④	SR 101L N after Union Hills on ramp merge
⑤	Frontage Road before Beardsley Road
⑥	Frontage Road South of Beardsely Road
⑦	U-Turn Ramp before merging with Union Hills on ramp
⑧	Union Hills on ramp before U-Turn ramp merge
⑨	Frontage Road north of U-Turn ramp
⑩	SR 101L W between 67th Avenue on ramp and 75th Avenue off ramp

Figure 4.11
U-Turn and Union Hills Ramp D
Merge before SR 101L Entrance

Table 4.1 – Weave and Merge/Diverge Influence Area Analysis – Case 1 AM Peak Hour

Case 1: U-Turn Ramp and Union Hills Ramp have separate merges to SR 101L N with Ramp Metering

Location 1 **SR 101L E before 75th Avenue Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	62.20	62.24	62.32	62.37	62.17	**62.26**	**0.08**
Headway (sec)	3.65	3.67	3.71	3.66	3.67	**3.67**	**0.02**
Density (vplpm)	16.1	16.0	15.8	16.0	16.0	**16.0**	**0.11**
LOS	B	B	B	B	B	**B**	

Location 2 **SR 101L W before Beardsley Road/Union Hills Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.58	61.58	61.87	61.60	61.63	**61.65**	**0.12**
Headway (sec)	3.24	3.24	3.37	3.24	3.24	**3.27**	**0.06**
Density (vplpm)	18.3	18.3	17.5	18.3	18.3	**18.1**	**0.36**
LOS	B	B	B	B	B	**B**	

Location 3 **SR 101L S after Beardsley Road/75th Ave On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.41	58.42	58.83	58.36	58.46	**58.50**	**0.19**
Headway (sec)	3.02	2.99	3.09	3.00	3.01	**3.02**	**0.04**
Density (vplpm)	20.7	20.9	20.1	20.19	20.8	**17.6**	**0.33**
LOS	C	C	C	C	C	**C**	

Location 4 **SR 101L N after Union Hills On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.76	61.88	62.06	61.99	61.83	**61.90**	**0.12**
Headway (sec)	3.65	3.67	3.70	3.66	3.67	**3.67**	**0.02**
Density (vplpm)	16.2	16.1	15.9	16.1	16.1	**16.1**	**0.11**
LOS	B	B	B	B	B	**B**	

Location 5 **Frontage Road north of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	43.35	43.53	43.25	43.45	43.31	**43.38**	**0.11**
Headway (sec)	6.59	6.41	6.76	6.37	6.44	**6.51**	**0.16**
Density (vplpm)	12.8	13.1	12.5	13.2	13.1	**12.9**	**0.29**
LOS	B	B	B	B	B	**B**	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.62	43.36	43.50	43.43	43.65	**43.51**	**0.12**
Headway (sec)	5.05	4.93	5.03	4.89	5.01	**4.98**	**0.07**
Density (vplpm)	16.6	17.1	16.7	17.2	16.7	**16.9**	**0.27**
LOS	B	B	B	B	B	**B**	

Location 7 **SR 101L N after the U-Turn merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.51	60.50	60.74	60.66	60.39	**60.56**	**0.14**
Headway (sec)	4.19	4.19	4.24	4.21	4.17	**4.20**	**0.03**
Density (vplpm)	14.4	14.4	14.2	14.3	14.5	**14.4**	**0.11**
LOS	B	B	B	B	B	**B**	

Location 8 **U-Turn Ramp before the Ramp Meter to SR 101L N**
Diverge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	33.80	34.00	33.90	33.80	34.20	**33.94**

Location 9 **Union Hills On-Ramp before the Ramp Meter to SR 101L N**
Diverge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	27.20	27.20	27.80	27.30	27.00	**27.30**

Location 10 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.91	60.78	61.34	61.09	60.83	**60.99**	**0.23**
Headway (sec)	3.03	3.02	3.15	3.02	3.00	**3.04**	**0.06**
Density (vplpm)	19.8	19.9	18.9	19.8	20.0	**19.7**	**0.44**
LOS	B	B	B	B	B	**B**	

Table 4.2 – Weave and Merge/Diverge Influence Area Analysis – Case 1 PM Peak Hour

Case 1: U-Turn and Union Hills on Ramps have separate merges to SR 101L N with Ramp Metering

Location 1 **SR 101L E before 75th Avenue Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.51	61.57	61.52	61.53	61.56	**61.54**	0.03
Headway (sec)	2.93	2.95	2.94	2.94	2.94	**2.94**	0.01
Density (vplpm)	20.3	20.1	20.2	20.2	20.2	**20.2**	0.07
LOS	C	C	C	C	C	**C**	

Location 2 **SR 101L W before Beardsley Road/Union Hills Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	54.29	54.71	50.83	54.58	54.96	**53.87**	**1.72**
Headway (sec)	2.71	2.75	2.74	2.71	2.76	**2.73**	**0.02**
Density (vplpm)	24.8	24.3	26.2	24.7	24.1	**24.8**	**0.82**
LOS	C	C	C	C	C	**C**	

Location 3 **SR 101L S after Beardsley Road/75th Ave On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.23	58.67	58.64	58.55	58.61	**58.54**	**0.18**
Headway (sec)	2.91	2.92	2.97	2.93	2.97	**2.94**	**0.03**
Density (vplpm)	21.6	21.3	21.0	21.3	21.0	**21.2**	**0.25**
LOS	C	C	C	C	C	**C**	

Location 4 **SR 101L N after Union Hills On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.88	59.00	58.94	58.97	58.99	**58.96**	**0.05**
Headway (sec)	2.93	2.95	2.95	2.94	2.94	**2.94**	**0.01**
Density (vplpm)	21.2	21.0	21.0	21.1	21.1	**21.1**	**0.08**
LOS	C	C	C	C	C	**C**	

Location 5 **Frontage Road north of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	42.62	42.05	42.37	42.67	42.26	**42.39**	**0.26**
Headway (sec)	3.79	3.76	3.67	3.74	3.73	**3.74**	**0.04**
Density (vplpm)	22.6	23.1	23.5	22.9	23.2	**23.1**	**0.34**
LOS	C	C	C	C	C	**C**	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.50	43.53	43.51	43.39	43.36	**43.46**	**0.08**
Headway (sec)	4.29	4.30	4.24	4.30	4.26	**4.28**	**0.03**
Density (vplpm)	19.6	19.5	19.8	19.6	19.8	**19.7**	**0.13**
LOS	C	C	C	C	C	**C**	

Location 7 **SR 101L N after the U-Turn merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.15	60.46	60.45	60.17	60.43	**60.33**	**0.16**
Headway (sec)	3.28	3.32	3.30	3.28	3.29	**3.29**	**0.02**
Density (vplpm)	18.5	18.2	18.3	18.5	18.4	**18.4**	**0.13**
LOS	C	C	C	C	C	**C**	

Location 8 **U-Turn Ramp near merge with Union Hills Ramp**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	34.50	34.70	34.60	34.70	34.50	**34.60**

Location 9 **Union Hills On-Ramp near the U-Turn Merge**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	5.20	6.40	5.80	5.10	5.80	**5.66**

Location 10 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	56.17	56.80	57.08	56.83	57.43	**56.86**	**0.46**
Headway (sec)	2.50	2.51	2.51	2.48	2.52	**2.50**	**0.02**
Density (vplpm)	26.0	25.6	25.5	25.9	25.2	**25.6**	**0.32**
LOS	C	C	C	C	C	**C**	

Table 4.3 – Weave and Merge/Diverge Influence Area Analysis – Case 2 AM Peak Hour

Case 2: U-Turn and Union Hills on Ramps with separate merges to SR 101L N without Ramp Metering

Location 1 SR 101L E before 75th Avenue Off-Ramp
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	62.06	61.99	62.15	62.02	62.29	**62.10**	**0.12**
Headway (sec)	3.70	3.68	3.65	3.66	3.67	**3.67**	**0.02**
Density (vplpm)	15.9	16.0	16.1	16.1	16.0	**16.02**	**0.08**
LOS	B	B	B	B	B	**B**	

Location 2 SR 101L W before Beardsley Road/Union Hills Off-Ramp
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.38	61.76	61.37	61.68	61.72	**61.58**	**0.19**
Headway (sec)	3.24	3.29	3.24	3.24	3.27	**3.26**	**0.02**
Density (vplpm)	18.4	18.0	18.4	18.3	18.1	**18.24**	**0.18**
LOS	B	B	B	B	B	**B**	

Location 3 SR 101L S after Beardsley Road/75th Ave On-Ramp merge
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.04	58.16	57.91	58.54	58.48	**58.23**	**0.27**
Headway (sec)	3.00	3.05	3.00	3.03	3.03	**3.02**	**0.02**
Density (vplpm)	21.0	20.6	21.0	20.6	20.6	**20.76**	**0.22**
LOS	C	C	C	C	C	**C**	

Location 4 SR 101L N after Union Hills On-Ramp merge
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.74	61.86	61.86	61.70	61.84	**61.80**	**0.07**
Headway (sec)	3.70	3.69	3.65	3.66	3.67	**3.67**	**0.02**
Density (vplpm)	16.0	16.0	16.2	16.2	16.1	**16.10**	**0.10**
LOS	B	B	B	B	B	**B**	

Location 5 Frontage Road north of Beardsley Road
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	43.31	43.44	43.14	43.21	43.26	**43.27**	**0.11**
Headway (sec)	6.80	6.68	6.47	6.41	6.60	**6.59**	**0.16**
Density (vplpm)	12.4	12.6	13.1	13.2	12.8	**12.82**	**0.33**
LOS	B	B	B	B	B	**B**	

Location 6 Frontage Road south of Beardsley Road
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.57	43.53	43.56	43.49	43.55	**43.54**	**0.03**
Headway (sec)	5.18	5.06	4.99	5.06	5.12	**5.08**	**0.07**
Density (vplpm)	16.2	16.6	16.8	16.6	16.4	**16.52**	**0.23**
LOS	B	B	B	B	B	**B**	

Location 7 SR 101L N after the U-Turn Ramp merge
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.32	60.35	60.43	60.28	60.50	**60.38**	**0.09**
Headway (sec)	4.24	4.20	4.17	4.18	4.22	**4.20**	**0.03**
Density (vplpm)	14.3	14.4	14.5	14.5	14.3	**14.40**	**0.10**
LOS	B	B	B	B	B	**B**	

Location 8 U-Turn Ramp before SR 101L N
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	34.00	33.60	34.10	33.90	34.00	**33.92**

Location 9 Union Hills On-Ramp before SR 101L N
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	27.20	27.60	27.30	27.70	27.10	**27.38**

Location 10 Frontage Road before the U-Turn Ramp
Weave Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	40.20	39.40	40.10	40.20	39.80	**39.94**

Location 11 SR 101L W between 67th Avenue and 75th Avenue
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.67	61.18	60.62	60.89	60.98	**60.87**	**0.23**
Headway (sec)	3.01	3.06	3.01	3.03	3.06	**3.03**	**0.03**
Density (vplpm)	20.0	19.5	20.0	19.8	19.6	**19.78**	**0.23**
LOS	C	C	C	C	C	**C**	

Table 4.4 – Weave and Merge/Diverge Influence Area Analysis – Case 2 PM Peak Hour

Case 2: U-Turn and Union Hills on Ramps with separate merges to SR 101L N without Ramp Metering

Location 1 SR 101L E before 75th Avenue Off-Ramp
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.41	61.35	61.28	61.26	61.29	**61.32**	**0.06**
Headway (sec)	2.95	2.89	2.89	2.87	2.87	**2.89**	**0.03**
Density (vplpm)	20.2	20.6	20.6	20.8	20.8	**20.60**	**0.24**
LOS	C	C	C	C	C	**C**	

Location 2 SR 101L W before Beardsley Road/Union Hills Off-Ramp
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	56.24	53.49	54.71	54.00	54.21	**54.53**	**1.05**
Headway (sec)	2.79	2.74	2.73	2.73	2.73	**2.74**	**0.03**
Density (vplpm)	23.3	24.9	24.5	24.8	24.7	**24.44**	**0.65**
LOS	C	C	C	C	C	**C**	

Location 3 SR 101L S after Beardsley Road/75th Ave On-Ramp merge
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.66	58.39	58.29	58.42	57.31	**58.21**	**0.52**
Headway (sec)	2.99	2.95	2.93	2.92	2.51	**2.86**	**0.20**
Density (vplpm)	20.8	21.2	21.4	21.4	25.4	**22.04**	**1.89**
LOS	C	C	C	C	C	**C**	

Location 4 SR 101L N after Union Hills On-Ramp merge
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.43	58.03	58.21	58.00	57.85	**58.10**	**0.22**
Headway (sec)	2.95	2.89	2.89	2.86	2.88	**2.89**	**0.03**
Density (vplpm)	21.2	21.8	21.7	22.0	21.9	**21.72**	**0.31**
LOS	C	C	C	C	C	**C**	

Location 5 Frontage Road north of Beardsley Road
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	42.08	41.58	42.25	42.03	42.03	**41.99**	**0.25**
Headway (sec)	3.86	3.74	3.74	3.76	3.76	**3.77**	**0.05**
Density (vplpm)	22.5	23.5	23.1	23.1	23.1	**23.06**	**0.36**
LOS	C	C	C	C	C	**C**	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.54	43.56	43.44	43.42	43.42	**43.48**	**0.07**
Headway (sec)	4.35	4.41	4.31	4.29	4.29	**4.33**	**0.05**
Density (vplpm)	19.3	19.0	19.5	19.6	19.6	**19.40**	**0.25**
LOS	C	C	C	C	C	C	

Location 7 **SR 101L N after the U-Turn Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.30	60.50	60.19	60.11	60.11	**60.24**	**0.16**
Headway (sec)	3.33	3.34	3.34	3.27	3.27	**3.31**	**0.04**
Density (vplpm)	18.2	18.1	18.2	18.6	18.6	**18.34**	**0.24**
LOS	C	C	C	C	C	C	

Location 8 **U-Turn Ramp before SR 101L N**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	34.40	34.80	34.70	34.60	34.50	**34.60**

Location 9 **Union Hills On-Ramp before SR 101L N**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	26.60	26.00	25.60	26.20	26.20	**26.12**

Location 10 **Frontage Road before the U-Turn Ramp**
Weave Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	40.50	40.90	40.10	39.90	40.50	**40.38**

Location 11 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	57.61	56.59	57.20	57.24	57.31	**57.19**	**0.37**
Headway (sec)	2.55	2.52	2.53	2.52	2.51	**2.53**	**0.02**
Density (vplpm)	24.9	25.6	25.2	25.3	25.4	**25.28**	**0.26**
LOS	C	C	C	C	C	**C**	

Table 4.5 – Weave and Merge/Diverge Influence Area Analysis – Case 3 AM Peak Hour

Case 3: U-Turn Ramp and Union Hills Ramp Merge before Merging to SR 101L N with Ramp Metering

Location 1 **SR 101L E before 75th Avenue Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	62.47	62.20	62.29	59.91	62.29	**61.83**	**1.08**
Headway (sec)	3.80	3.77	3.78	3.76	3.81	**3.78**	**0.02**
Density (vplpm)	15.4	15.6	15.5	16.2	15.4	**15.6**	**0.33**
LOS	B	B	B	B	B	B	

Location 2 **SR 101L W before Beardsley Road/Union Hills Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.62	61.46	61.50	61.66	61.64	**61.58**	**0.09**
Headway (sec)	3.21	3.21	3.21	3.24	3.20	**3.21**	**0.02**
Density (vplpm)	18.5	18.5	18.5	18.3	18.5	**18.5**	**0.09**
LOS	B	B	B	B	B	B	

Location 3 **SR 101L S after Beardsley Road/75th Ave On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.68	58.48	58.64	58.88	58.82	**58.70**	**0.16**
Headway (sec)	2.99	2.98	3.01	3.01	3.00	**3.00**	**0.01**
Density (vplpm)	20.8	21.0	20.7	20.6	20.7	**20.8**	**0.15**
LOS	C	C	C	C	C	C	

Location 4 **SR 101L N after Union Hills On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	60.14	59.91	59.97	59.91	59.99	**59.98**	**0.09**
Headway (sec)	3.77	3.76	3.78	3.76	3.81	**3.78**	**0.02**
Density (vplpm)	16.1	16.2	16.1	16.2	16.0	**16.1**	**0.08**
LOS	B	B	B	B	B	B	

Location 5 **Frontage Road north of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	43.29	43.19	43.14	43.47	43.28	**43.27**	**0.13**
Headway (sec)	6.07	6.27	6.57	6.62	6.75	**6.46**	**0.28**
Density (vplpm)	13.9	13.5	12.9	12.7	12.5	**13.1**	**0.58**
LOS	B	B	B	B	B	B	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.74	43.32	43.57	43.55	43.54	**43.54**	**0.15**
Headway (sec)	4.89	4.90	5.08	5.15	5.15	**5.03**	**0.13**
Density (vplpm)	17.1	17.2	16.5	16.3	16.3	**16.7**	**0.44**
LOS	B	B	B	B	B	B	

Location 7 **U-Turn Ramp near merge with Union Hills Ramp**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	2.00	2.20	1.90	2.50	2.30	**2.18**

Location 8 **Union Hills On-Ramp near the Ramp Meter**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	26.80	26.30	27.10	26.50	26.80	**26.70**

Location 9 **Frontage Road North of U-Turn Ramp**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	19.00	28.80	11.90	36.40	31.00	**25.42**

Location 10 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	60.08	60.00	59.91	60.11	59.95	**60.01**	**0.08**
Headway (sec)	3.00	2.99	3.00	2.99	3.00	**3.00**	**0.01**
Density (vplpm)	20.3	20.4	20.3	20.3	20.3	**20.3**	**0.04**
LOS	C	C	C	C	C	**C**	

Table 4.6 – Weave and Merge/Diverge Influence Area Analysis – Case 3 PM Peak Hour

Case 3: U-Turn Ramp and Union Hills Ramp Merge before merging to SR 101L N with Ramp metering

Location 1 **SR 101L E before 75th Avenue Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	62.40	62.21	62.31	62.29	62.19	**62.28**	**0.08**
Headway (sec)	3.80	3.77	3.81	3.78	3.77	**3.79**	**0.02**
Density (vplpm)	15.4	15.6	15.4	15.5	15.6	**15.50**	**0.10**
LOS	B	B	B	B	B	B	

Location 2 **SR 101L W before Beardsley Road/Union Hills Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	59.37	59.72	59.94	59.56	59.74	**59.67**	**0.21**
Headway (sec)	2.39	2.42	2.41	2.41	2.41	**2.41**	**0.01**
Density (vplpm)	25.8	25.3	25.3	25.5	25.4	**25.46**	**0.21**
LOS	C	C	C	C	C	C	

Location 3 **SR 101L S after Beardsley Road/75th Ave On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	55.61	55.79	55.78	55.70	55.79	**55.73**	**0.08**
Headway (sec)	2.23	2.28	2.26	2.26	2.26	**2.26**	**0.02**
Density (vplpm)	29.4	28.7	29.0	29.0	29.0	**29.02**	**0.25**
LOS	D	D	D	D	D	D	

Location 4 **SR 101L N after Union Hills On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	60.10	59.92	60.03	59.99	59.94	**60.00**	**0.07**
Headway (sec)	3.80	3.76	3.80	3.78	3.76	**3.78**	**0.02**
Density (vplpm)	16.0	16.2	16.0	16.1	16.2	**16.1**	**0.10**
LOS	B	B	B	B	B	B	

Location 5 **Frontage Road north of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	43.43	43.27	43.53	43.36	43.33	**43.38**	**0.10**
Headway (sec)	6.52	6.21	6.51	6.20	6.39	**6.37**	**0.16**
Density (vplpm)	12.9	13.6	12.9	13.6	13.2	**13.2**	**0.35**
LOS	B	B	B	B	B	B	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.60	43.56	43.69	43.68	43.53	**43.61**	**0.07**
Headway (sec)	4.99	4.96	5.01	4.92	5.03	**4.98**	**0.04**
Density (vplpm)	16.8	16.9	16.7	17.0	16.7	**16.8**	**0.13**
LOS	B	B	B	B	B	B	

Location 7 **U-Turn Ramp near merge with Union Hills Ramp**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	1.90	1.80	2.10	2.10	2.60	**2.10**

Location 8 **Union Hills On-Ramp near the Ramp Meter**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	26.80	26.50	27.10	26.90	27.10	**26.88**

Location 9 **Frontage Road North of U-Turn Ramp**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	6.30	8.30	12.00	32.70	34.00	**18.66**

Location 10 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	56.95	57.47	57.77	56.95	56.99	**57.23**	**0.38**
Headway (sec)	2.27	2.30	2.29	2.29	2.29	**2.29**	**0.01**
Density (vplpm)	28.3	27.7	27.6	28.0	28.0	**27.9**	**0.28**
LOS	D	C	C	C	C	**C**	

Table 4.7 – Weave and Merge/Diverge Influence Area Analysis – Case 4 AM Peak Hour

Case 4: U-Turn Ramp and Union Hills Ramp Merge before merging to SR 101L N without Ramp Metering

Location 1 **SR 101L E before 75th Avenue Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	62.00	62.21	62.20	62.15	62.02	**62.12**	**0.10**
Headway (sec)	3.62	3.69	3.67	3.67	3.66	**3.66**	**0.03**
Density (vplpm)	16.3	15.9	16.0	16.0	16.1	**16.1**	**0.15**
LOS	B	B	B	B	B	B	

Location 2 **SR 101L W before Beardsley Road/Union Hills Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	61.66	61.44	61.75	61.82	61.60	**61.65**	**0.15**
Headway (sec)	3.53	3.74	3.56	3.54	3.55	**3.58**	**0.09**
Density (vplpm)	16.8	15.9	16.6	16.7	16.7	**16.5**	**0.36**
LOS	B	B	B	B	B	B	

Location 3 **SR 101L S after Beardsley Road/75th Ave On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	58.77	58.19	58.40	58.82	58.72	**58.58**	**0.27**
Headway (sec)	3.34	3.30	3.35	3.34	3.36	**3.34**	**0.02**
Density (vplpm)	18.6	19.0	18.7	18.6	18.5	**18.7**	**0.19**
LOS	B	B	B	B	B	B	

Location 4 **SR 101L N after Union Hills On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	59.21	59.46	59.44	59.36	59.39	**59.37**	**0.10**
Headway (sec)	3.63	3.61	3.68	3.66	3.66	**3.65**	**0.03**
Density (vplpm)	17.0	17.0	16.7	16.8	16.8	**16.9**	**0.13**
LOS	B	B	B	B	B	B	

Location 5 **Frontage Road north of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	43.03	43.08	43.05	43.18	43.13	**43.09**	**0.06**
Headway (sec)	5.70	5.65	5.62	5.76	5.88	**5.72**	**0.10**
Density (vplpm)	14.9	15.0	15.1	14.7	14.4	**14.8**	**0.28**
LOS	B	B	B	B	B	B	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.43	43.58	43.31	43.29	43.68	**43.46**	**0.17**
Headway (sec)	4.75	4.79	4.77	4.85	4.86	**4.80**	**0.05**
Density (vplpm)	17.7	17.5	17.7	17.4	17.2	**17.5**	**0.21**
LOS	B	B	B	B	B	B	

Location 7 **U-Turn Ramp near merge with Union Hills Ramp**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	27.70	28.10	28.00	27.40	28.00	**27.84**

Location 8 **Union Hills On-Ramp near the Ramp Meter**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	27.00	27.40	27.20	27.50	27.70	**27.36**

Location 9 **Frontage Road North of U-Turn Ramp**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	40.00	40.00	39.70	39.10	40.20	**39.80**

Location 10 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	59.90	59.82	60.09	60.08	59.95	**59.97**	**0.12**
Headway (sec)	3.16	3.13	3.17	3.18	3.17	**3.16**	**0.02**
Density (vplpm)	19.3	19.5	19.2	19.1	19.2	**19.3**	**0.15**
LOS	B	B	B	B	B	**B**	

Table 4.8 – Weave and Merge/Diverge Influence Area Analysis – Case 4 PM Peak Hour

Case 4: U Turn Ramp and Union Hills Ramp Merge before merging to SR 101L N without Ramp Metering

Location 1 **SR 101L E before 75th Avenue Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	62.16	62.02	61.96	62.26	62.14	**62.11**	**0.12**
Headway (sec)	3.63	3.66	3.66	3.65	3.65	**3.65**	**0.01**
Density (vplpm)	16.2	16.1	16.1	16.1	16.1	**16.1**	**0.04**
LOS	B	B	B	B	B	B	

Location 2 **SR 101L W before Beardsley Road/Union Hills Off-Ramp**
Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	60.28	60.71	60.34	60.60	60.43	**60.47**	**0.18**
Headway (sec)	2.71	2.75	2.77	2.75	2.75	**2.75**	**0.02**
Density (vplpm)	22.4	21.9	21.9	21.9	22.0	**22.0**	**0.22**
LOS	C	C	C	C	C	C	

Location 3 **SR 101L S after Beardsley Road/75th Ave On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	56.90	55.82	56.69	56.92	56.91	**56.65**	**0.47**
Headway (sec)	2.58	2.60	2.61	2.61	2.60	**2.60**	**0.01**
Density (vplpm)	24.9	25.2	24.7	24.6	24.7	**24.8**	**0.24**
LOS	C	C	C	C	C	C	

Location 4 **SR 101L N after Union Hills On-Ramp merge**
Merge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	59.32	59.30	59.20	59.39	59.19	**59.28**	**0.08**
Headway (sec)	3.62	3.65	3.67	3.64	3.65	**3.65**	**0.02**
Density (vplpm)	17.0	16.9	16.8	16.9	16.9	**16.9**	**0.07**
LOS	B	B	B	B	B	B	

Location 5 **Frontage Road north of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	Average	Standard Deviation
Speed (mph)	43.13	43.35	43.17	43.27	42.89	**43.16**	**0.17**
Headway (sec)	5.76	5.66	5.68	5.78	5.72	**5.72**	**0.05**
Density (vplpm)	14.7	14.9	14.9	14.6	14.9	**14.8**	**0.14**
LOS	B	B	B	B	B	B	

Location 6 **Frontage Road south of Beardsley Road**
Weave Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	43.50	43.47	43.55	43.58	43.47	**43.51**	**0.05**
Headway (sec)	4.88	4.75	4.82	4.76	4.86	**4.81**	**0.06**
Density (vplpm)	17.2	17.7	17.4	17.6	17.3	**17.4**	**0.21**
LOS	B	B	B	B	B	B	

Location 7 **U-Turn Ramp near merge with Union Hills Ramp**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	27.70	27.50	27.70	25.40	27.70	**27.20**

Location 8 **Union Hills On-Ramp near the Ramp Meter**
Merge Influence Area Posted Speed 30mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	26.60	27.40	26.70	27.00	26.80	**26.90**

Location 9 **Frontage Road North of U-Turn Ramp**
Merge Influence Area Posted Speed 45mph

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**
Speed (mph)	39.60	38.40	39.40	40.00	39.30	**39.34**

Location 10 **SR 101L W between 67th Avenue and 75th Avenue**
Merge-Diverge Influence Area

	Run 1	Run 2	Run 3	Run 4	Run 5	**Average**	**Standard Deviation**
Speed (mph)	58.02	58.48	58.25	58.25	57.94	**58.19**	**0.21**
Headway (sec)	2.48	2.52	2.53	2.54	2.52	**2.52**	**0.02**
Density (vplpm)	25.4	24.8	24.8	24.7	25.0	**24.9**	**0.28**
LOS	C	C	C	C	C	**C**	

The new 75th Avenue/Beardsley Road on-ramp will be a parallel on-ramp. It will merge with traffic prior to the Union Hills Overpass. This will provide sufficient merge distance for the 75th Avenue / Beardsley Road on-ramp with southbound SR 101L.

The U-Turn on-ramp will enter the freeway prior to the Union Hills entrance. The existing Union Hills on-ramp will be reconstructed farther north to allow for separation between the two entrances. There is sufficient space prior to the 75th Avenue off-ramp for the new location.

4.5.5 Intersections

A Level of Service (LOS) analysis was completed for six locations. All locations operated at a LOS of C or better for the year 2030 with the exception of Beardsley Road/83rd Avenue that operated at a LOS of D. The results of the analysis are listed in Figure 4.9.

The locations included the intersection of 75th Avenue / SR 101L SB Ramps, 75th Avenue / SR 101L NP Ramps, Union Hills Drive / SB 101L SB Ramps, Union Hills Drive / SR 101L NB Ramps, Beardsley Road / 81st Avenue, and Beardsley Road / 83rd Avenue.

Table 4.9 – 2030 Level of Service Analysis (AM/PM Peak Hour)

Year 2030 Intersection LOS Analysis					
Intersections	Control	AM Peak		PM Peak	
		Average Control Delay (sec)	LOS[1]	Average Control Delay LOS [1]	LOS[1]
1. 75th Avenue / SR101 SB Ramps	SIG	26.2	C	25.0	C
2. 75th Avenue / SR101 NB Ramps	SIG	19.5	B	25.4	C
3. Union Hills Drive / SR101 SB Ramps	SIG	18.6	B	22.3	C
4. Union Hills Drive / SR101 NB Ramps	SIG	19.6	B	33.1	C
5. Beardsley Road / 81st Avenue	SIG	16.3	B	18.3	B
6. Beardsley Road / 83rd Avenue	SIG	34.2	C	37.0	D

Notes:
SIG – Signalized Intersection
1. Level of Service for signalized intersections based on average control delay per vehicle, according to the Highway Capacity Manual, Transportation Research Board, 2000.

4.5.6 Residential Traffic

Increased traffic on 81st Avenue has been a concern from many of the residents in Fletcher Heights. There is an elementary school approximately ½ mile north of the Beardsley intersection. Many students walking to school and additional traffic during the morning hours cause concerns with some of the residents. The traffic projections on 81st Avenue do show minor increases in volume. The traffic volumes do not indicate there will be a dramatic increase in traffic on 81st Avenue caused by this project. However, as a good faith effort the City will include traffic calming as part of this project on 81st Avenue to further deter traffic. A stamped concrete choker median island will be installed just north of the Beardsley intersection. A similar median island will be constructed on the south side to represent uniformity of residential areas. A left turn lane will not be constructed for southbound traffic to further discourage cut through traffic. Approximately 500-feet north of the intersection a speed table will be installed. Additional traffic calming farther north and up to Deer Valley Road will need to be proposed by the residents through the City of Peoria's Neighborhood Traffic Management Program (NTMP).

5.0 AASHTO CONTROLLING DESIGN CRITERIA

5.1 Introduction

Projects within ADOT's Right of Way and/or projects using Federal Funding require a review of the AASHTO Controlling Design Criteria. This review of the AASHTO Controlling Design Criteria is an agreement between ADOT and FHWA that all projects involving Federal Funding (and state funding) will be evaluated relative to the AASHTO Green Book[1]. At this time, ADOT has not adopted the 2004 AASHTO Green Book so all minimum criteria values come from the 1990 Green Book except for Vertical Curve Alignment and Stopping Sight Distance.[2] The review of the AASHTO Controlling Design Criteria is a procedure where twelve design elements are compared to the existing conditions throughout the project. If the existing conditions do not meet the minimum values and will not be upgraded as part of the scope of work, then a design exception for that particular element(s) will have to be requested from FHWA and/or the Administrator, ADOT Roadway Engineering Group. Since there will not be any work on Union Hills Drive and 75th Avenue, review of the criteria was not required for these crossroads. For the other roadway sections of this project, the AASHTO Controlling Design Criteria was evaluated. **(Appendix 9.4)**

5.1.1 AASHTO Design Speed

The design speeds used in this section for evaluating the AASHTO Controlling Design Criteria of the twelve existing design elements have no relationship to the design speed(s) that will be used for the actual design of this project. A discussion of the actual design speed(s) used for design of this project can be found in Section 6.1.

Agua Fria Freeway – SR 101L is classified as an Urban Freeway. The design speed of 50 mph came from Page 582 of the 1990 Green Book. The as-built plans for Projects RBM-600-0-503 and AZM-600-0-505 indicate that the SR 101L mainline was constructed to a 65 mph design speed.

Freeway Ramps – ramp design speed of 50 mph came from Page 28 of 32 of the Procedural Guide For Review Of The AASHTO Controlling Criteria On Existing ADOT Roadways[3] The as-built plans for Projects RBM-600-0-503 and AZM-600-0-505 indicate that the Ramps were constructed to a 50 mph design speed.

Beardsley Road – Beardsley Road was classified as an Urban Arterial with a design speed of 50 mph (see page 524 of the 1990 Green Book). The posted speed limit west of 83rd Avenue is 40 mph and 30 mph east of 83rd Avenue.

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[1] A Policy on Geometric Design of Highways and Streets 1990, published by the American Association of State Highway and Transportation Officials.

[2] The analysis of vertical curve stopping sight distance is based upon the 2001 Green Book where roadway grade is used to calculate the stopping sight distance.

[3] This procedural guide further clarifies the design criteria in the Green Book and can be viewed at ADOT's Predesign Section's website.

5.2 Lane Width and Shoulder Width

Agua Fria Freeway - Minimum lane width (12-feet) and shoulder width (10-feet inside and outside) used for Urban Freeways came from Page 583 of the 1990 Green Book. The as-built plans for Projects RBM-600-0-503 and AZM-600-0-505 indicate the paved inside shoulder width of 8-feet is 2-feet less than the recommended minimum; however, there is a 30-foot graded median between the roadways which can also serve as a graded shoulder. Therefore, no design exception will be needed for shoulder width.

Freeway Ramps - Maximum and minimum ramp widths were determined from Table X-3, Page 976 of the 1990 Green Book and the procedures outline on Page 977 supplemented by FHWA's memo of September 28, 1988.[4] All existing ramp widths meet or exceed the minimum.

Beardsley Road – The minimum lane width on an arterial street is 10-feet. All lane widths on Beardsley Road are currently 12-feet or greater.

5.3 Maximum Allowable Grades

Agua Fria Freeway - Maximum allowable grade of 4% came from Page 585 of the 1990 Green Book. All mainline grades are less than the maximum allowable grade of 4%.

Freeway Ramps - Maximum allowable ramp grade of 8% came from Page 964 of the 1990 Green Book. All ramps are less than the maximum allowable grade with the steepest grade of +2.9421% being on the southbound exit ramp at 75th Avenue.

Beardsley Road – Maximum allowable grade of 7% came from Page 525 of the 1990 Green Book. The Beardsley Road profile grade is a series of short grades broken by grade breaks. The steepest grade on Beardsley Road is 0.7987%.

5.4 Cross Slopes

Maximum allowable cross slope range of 1.5% to 2.0% for the mainline Loop 101 came from Page 583 of the 1990 Green Book. Maximum allowable cross slope range of 1.5% to 2.0% for the ramps came from Page 965 of the 1990 Green Book. The maximum allowable cross slope range of 1.5% to 3.0% for Beardsley Road came from Page 525 of the 1990 Green Book. As built plans indicate that all existing cross slopes are 2.0%, which is within the allowable range.

5.5 Existing Bridge Structures[5]

Since the three[6] bridges within the limits of this DCR are not included in the scope of work, the only AASHTO Controlling Design Criteria bridge element that needed to be evaluated was Minimum Allowable Clearance for the two overpasses (Union Hills Drive TI and 75th Avenue TI overpasses). Since there will be no adjustments to the mainline

[4] This memo can be viewed on ADOT's Predesign Section's website.
[5] Spans equal or greater than 20 feet.
[6] The third bridge is a RCB (Structure # 6837) located just north of the intersection of 75th Avenue and the southbound on and off ramps and will not be affected by the scope of work.

profile grade, both vertical clearances (16.92 feet at Union Hills Drive TI and 16.42 feet at 75th Avenue) will not change and will remain greater than the minimum allowable vertical clearance of 16 feet.

5.6 Vertical Curve Alignment and Stopping Sight Distance

Agua Fria Freeway – The existing vertical alignment contains 10 vertical curves (five in each direction). All mainline vertical curves far exceed the minimum AASHTO Stopping sight distance. (Appendix 9.4 AASHTO Controlling Design Criteria Report)

Freeway Ramps – All ramps exceed AASHTO Controlling Design Criteria for Vertical Curve Stopping Sight Distance of 438-feet or less.

Beardsley Road (between the intersections of 81st to 83rd Avenues) – There are no vertical curves in this section of Beardsley Road. A review of the as built plans indicates that changes in profile grade are by a series of grade breaks of less than 1% that meet the allowable grade break without a vertical curve.

5.7 Horizontal Alignment and Superelevation

Agua Fria Freeway – The existing horizontal alignment contains five horizontal curves (three curves in the southbound direction and two curves in the northbound direction). The degree of curvature ranges from 0°-45'-05" to 1°-38'-28.6". All five of these existing horizontal curves meet AASHTO Controlling Design Criteria for degree of curvature and superelevation.

Freeway Ramps – All ramps exceed AASHTO Controlling Design Criteria for degree of curvature. The existing superelevation for Ramp D (the northbound on ramp at Union Hills Drive TI) is .003 feet/feet less than the recommended minimum of .031 feet/feet. The data for this curve was obtained from the plans of Project RBM-600-0-503 (page 58 of 412). The HPI station for this curve is Station 11+31.12. This curve begins at Sta 9+70.00, ends at Sta 12+92.05 and is referenced on the project plans as "Curve D-1". Since this section of Ramp D will be reconstructed to current standards as part of the scope of work, no design exception will be required. Also, the existing superelevation for Ramp C (the southbound exit ramp at 75th Avenue TI) is .018 feet/feet less than the recommended minimum of .049 feet/feet. The superelevation data for this curve was obtained from the plans of Project AZM-600-0-505 (page 78 of 352). The HPI station for this curve is Station 2+32.25. This curve begins at Sta 0+89 and ends at Sta 3+75.13 and is referenced on the plans as "Curve 30". Detailed discussion of this curve is in the following subsection 4.7.1.

Beardsley Road (between the intersections of 81st to 83rd Avenues) – The horizontal alignment of Beardsley Road is tangent.

5.7.1 75TH Avenue TI Southbound Off Ramp (Ramp C) Superelevation

The AASHTO Controlling Design Criteria was evaluated for Ramp C because both Alternates affect this ramp. Alternate 1 will not change any of the existing ramp geometrics; however, additional traffic will now use this ramp and the new frontage road to access Beardsley Road. Alternate 2 will change the ramp geometrics because the existing gore will be relocated to accommodate

extending the existing auxiliary lane. This ramp currently meets or exceeds the design criteria reviewed for this project.

6.0 MAJOR DESIGN FEATURES OF THE RECOMMENDED ALTERNATIVE

6.1 Design Controls

Criteria	Beardsley Connector	SB Frontage Road	U Turn At Union Hills Dr	Ramps
Design Speed	50 mph 35 mph at Fr Rd	50 mph	20 mph 25 mph (Sweeping U)	60 mph at 101L 50 mph main body
Roadway Width	64 feet	28 feet typical 22 to 40 feet	26 feet typical Widens at curves	22 feet typical 22 to 40 feet
Travel Lane Width	12 feet	12 feet	12 feet	12 feet
Shoulder Width	2 feet	2 feet (2-lanes) 2 feet left (1-lane) 8 feet right(1-lane)	2 feet	2 feet (2-3 lanes) 2 feet left (1-lane) 8 feet right(1-lane)
Horizontal Curvature	Rmin = 500 feet	Dmax = 6 degrees	Rmin = 85 feet Rmin = 135 feet (Sweeping U)	Dmax = 6 degrees
Pavement Cross Slope	0.02 ft/ft	0.02 ft/ft	0.02 ft/ft	0.02 ft/ft
Maximum Superevevation	Emax = 0.04 ft/ft	Emax = 0.04 ft/ft	Emax = 0.02 ft/ft Emax = 0.04 ft/ft (Sweeping U)	Emax = 0.04 ft/ft
Maximum Grade	8%	6%	6%	6%
Max. Grade Break	1%	0.20%	0.20%	0.20%
Minimum Grade w/Gutters	0.20%	0.40%	0.40%	0.40%
Slope Standards	4:1	3:1	4:1	4:1
Right of Way Width	110 feet Min 130 feet Max	N/A	N/A	N/A
Sidewalk Width	5 feet to 10 feet	N/A	N/A	N/A

6.2 Horizontal and Vertical Alignments

There are five horizontal curves on SR 101L. All five curves meet the AASHTO Design Criteria for degree of curvature. There are 10 vertical curves along mainline that all meet the stopping sight distance criteria.

The existing ramps that will not be reconstructed meet the AASHTO criteria for degree of curvature and sight distance criteria.

There are no horizontal or vertical curves on Beardsley Road between 81st Avenue and 83rd Avenue. Beardsley Road east of 81st Avenue will be new construction. There is one curve approximately 125-feet east of the intersection that will have a 950-foot radius

curve. This exceeds the minimum curve radius of 800-feet. There is one 800-foot vertical curve over New River that meets the sight distance criteria.

6.3 Access

Access to Beardsley Road east of 81st Avenue will need to be further evaluated during final design. The southeast parcel at the intersection of 81st Avenue/Oraibi Drive and Beardsley can gain access from Oraibi Drive. Access from Beardsley may be permitted but would need to allow sufficient distance from the intersection. New access points will need to obtain approval through the City of Peoria permitting process at the time of development. There will be no new accesses on Beardsley between 81st Avenue and 83rd Avenue.

Access control for SR 101L will generally remain in the existing location. It will fall between the freeway and the frontage road. There will be a change in the existing access control with the reconfiguration of the ramps. A Change in Access Report will need to be processed and approved through ADOT.

The Church of Joy has requested a new access onto the frontage road. The preliminary studies indicated that right in right out access could be allowed to the frontage road. The location of the access may be located anywhere between 600 to 750-feet west of the 75th Avenue intersection. This access has been discussed with the City of Peoria and Glendale as well as ADOT. ADOT does have some concerns regarding this access that will need to be addressed during final design. It is not the intent of this project to provide an access for Church of Joy. Once the Church decides to construct the new access they will need to go through the permit process with the City of Glendale and ADOT. It is recommended that if an access is approved that a deceleration lane be constructed.

Access will be allowed from the frontage road to the parcels adjacent to the east bank of New River. There are limited areas where access can be provided due to the weaving areas and SR 101L ramp locations. South of the Beardsley Connector access will be allowed south of the new on-ramp. The location of access should not allow vehicles to enter SR 101L at this point. The property owner will need to go through the permit process with the City of Glendale and ADOT once the properties are developed. Weaving distances and location in proximity to intersections and ramps will be reviewed.

Access to the parcels east of New River and directly north and south of Beardsley may be permitted right-in and right-out access. These access areas will influence the operation of the frontage road; therefore, ADOT will need to be involved during the permit process. In preliminary discussions with ADOT there has been discussions regarding installing a raised median to further restrict left-turn movements. The property owner will need to go through the permit process with the City of Glendale and ADOT once the properties are developed. (Figure 6.1)

6.4 Right-of-Way

Approximately 20 acres of additional right of way will be required for this project, which includes eight separate parcels. There will be no residential or commercial structures impacted by the proposed project. Table 6.1 gives a preliminary estimate of right of way requirements from each parcel. (Figure 6.2)

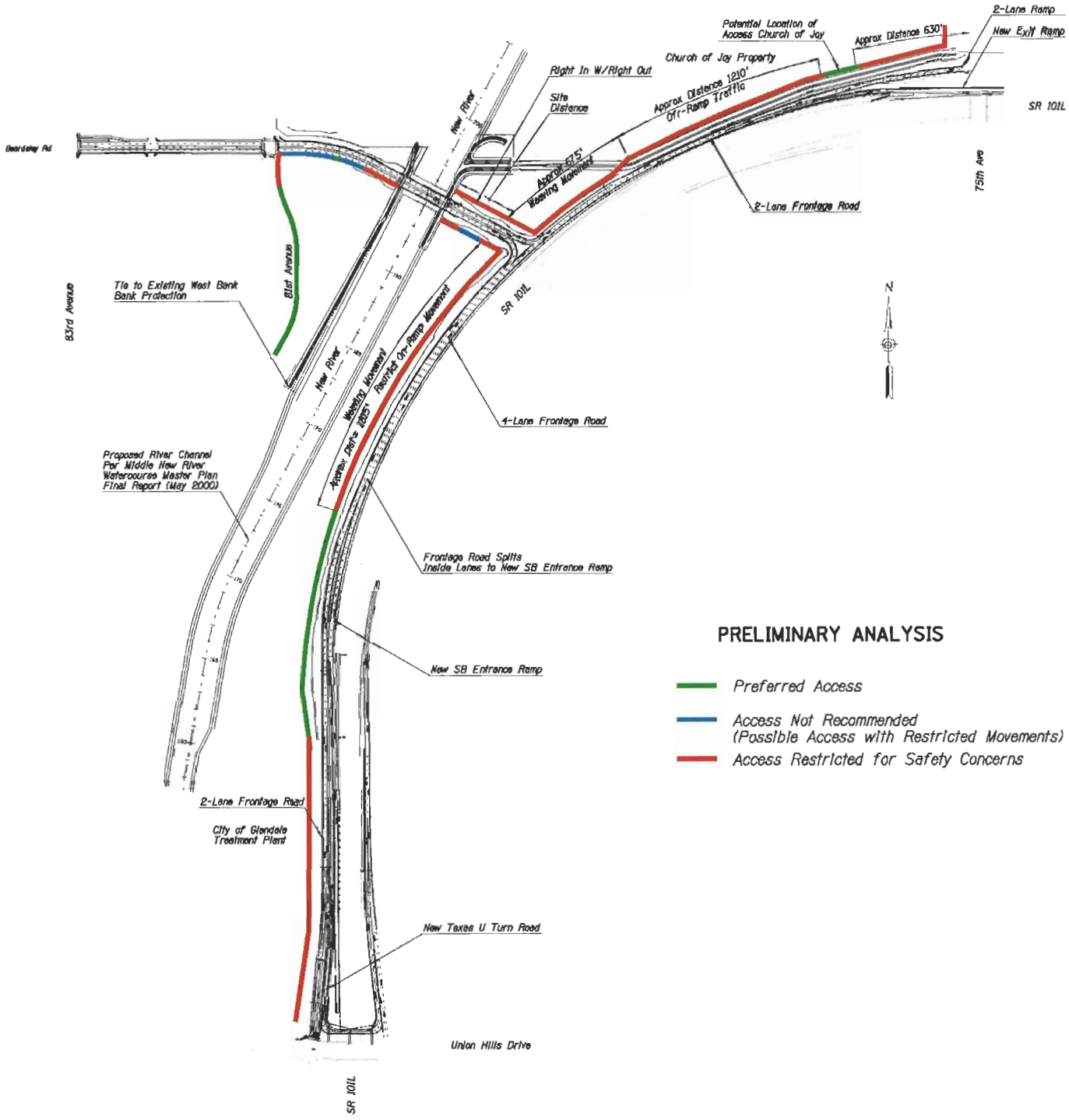

Figure 6.1
Access Control Concept

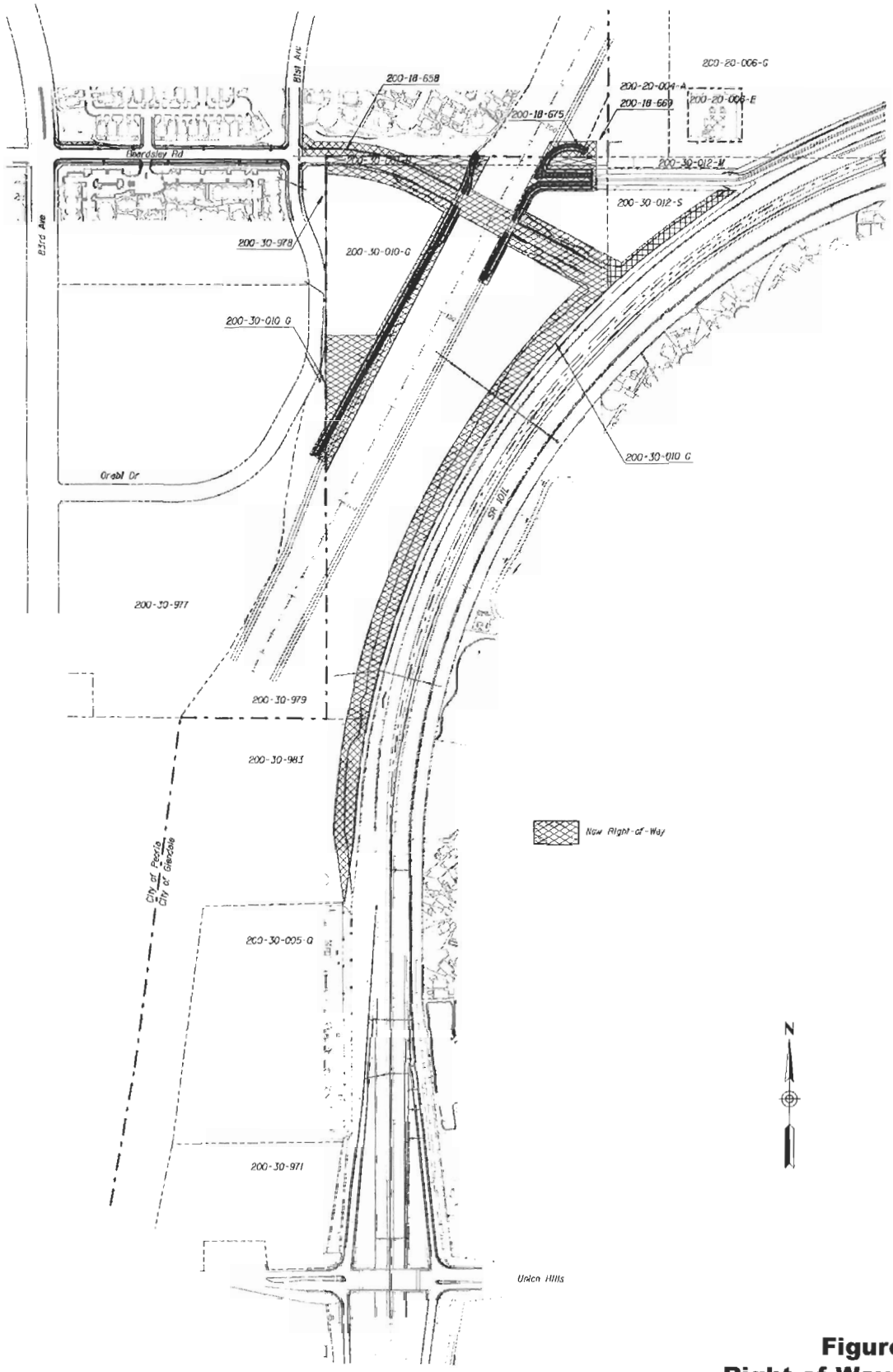

Figure 6.2
Right of Way Map

Table 6.1 – Right of Way Requirements

PARCEL NUMBER	Parcel (Acres)	Parcel (SqFt)	To Be Acquired (Acres)	To Be Acquired (SqFt)
200-18-658	4.72	205,385	0.6140	26,746
200-18-669	0.42	18,208	0.0971	4,230
200-18-675	6.87	299,388	0.2824	12,303
200-20-004-A	12.12	528,000		
200-20-006-G	87.50	3,811,319		
200-30-001-B	1.21	52,795	0.9493	41,351
200-30-005-Q	18.79	818,623		
200-30-010-G	46.11	2,008,334	15.4613	673,496
200-30-012-M	0.76	32,888		
200-30-012-S	4.99	217,495	0.8705	37,921
200-30-978	0.81	35,308		
200-30-979	12.27	534,309	0.1409	6,138
200-30-983	24.17	1,052,889	1.5501	67,552
		Total	19,9656	869,737

6.5 Drainage

The proposed project will add a frontage road along the north side of the Agua Fria Freeway and modify the 75th Avenue on ramp configuration. This will allow westbound traffic to reach Beardsley Road. The proposed improvements will require inlets for the frontage road and modified ramp. These inlets will be designed for a 10-year return interval. The storm drain network will outlet to the existing drainage channel, north of the proposed frontage road. Another storm drain system will outlet to the New River along the southern boundary of Beardsley Road. This facility will drain the frontage road from the offsite channel to a point south of Beardsley Road.

The proposed frontage road from south of Beardsley Road to Union Hills Drive will tie into the existing Agua Fria Freeway drainage system, flow south and discharge into New River. The final designer shall verify the capacity of the existing storm drain laterals.

The proposed Union Hills Drive on ramp will discharge to the adjacent drainage channel directly to the east.

Beardsley Road will be extended from 81st Avenue across New River to the Agua Fria Freeway. Existing Beardsley Road has a drainage channel along its north boundary (Fletcher Heights Channel). The proposed roadway will encroach into the existing channel. A retaining wall will be constructed along the north side of Beardsley Road to serve as one side of the channel. The channel will outlet immediately upstream of the Beardsley Road bridge.

The proposed drainage system for the New River Bridge will not allow storm water to discharge directly into New River. Storm water will flow off of the bridge structure into local retention basins or oil water separators. The storm water may then be discharged to New River. This concept is in compliance with the Best Management Practice (BMP) from the Arizona Department of Water Resources.

Bank protection will be constructed along the west side of New River from the Fletcher Heights Channel to a point near Oraibi Drive. Bank protection will be constructed along the east side of New River from the Agua Fria Freeway Drainage Channel to a point approximately 200 feet south of Beardsley Road.

It is recommended that the bank protection be extended to Union Hills Drive in the future. It is anticipated that future developments will be required to construct bank protection adjacent to their property until the bank protection for the reach has been completed.

6.6 Earthwork

The Beardsley Connector project will be an import borrow project. The areas adjacent to New River will need to be built-up out of the flood plain. Likewise, the frontage road is required to be out of the flood plain. To construct the frontage road will required on average 10-feet of embankment material. There is approximately 180,000 cubic yards of borrow material estimated for this project.

The material on-site consists primarily of silty sand, clayey sands and undocumented silty sand and clayey sand fills. This material may have a tendency to swell or collapse upon inundation with water. New pavement sections should be constructed on import material.

On-site excavation can be accomplished with conventional earthmoving equipment. There is evidence of cobbles at a relatively shallow depth. If cobbles are encountered during excavation it will slow production. A track mounted ripper or hydraulic hoe ram may be necessary to excavate this material. **(Geotechnical Evaluation - Appendix 9.5)**

6.7 Traffic Control and Constructability

Construction of the bridges will be the controlling item of work. The construction of the New River Bridge will be relatively straight forward. The new U-turn structure will be constructed over SR 101L. Since it is an AASHTO girder bridge the impacts to traffic will be relatively minor. There will be temporary closures when the girders are being placed. Other than the placement of the girders there will be temporary lane restrictions.

Ramp closures will be required with the reconfiguring of the 75th Avenue on-ramp and Union Hills off-ramp. The frontage road will need to be constructed prior to either ramp closure. It is anticipated that the Union Hills southbound off-ramp will be closed first to construct the new 75th Avenue/Beardsley on-ramp. Both ramps should not be closed concurrently to help keep traffic moving through the construction zone.

Widening of the 83rd Avenue and Beardsley intersection to construct dual right turn lanes will require some lane restrictions. Operational impacts to of the intersection should be minimal. Beardsley Road between 83rd Avenue and 81st Avenue will require lane restrictions on the south side of the roadway. There is sufficient pavement within this section to allow for the required construction work area.

With the exception of the ramp closures required during construction and the construction of the "U-Turn" structure there should be limited impacts to the traveling

public. Public notification will be required prior to any construction and again in advance of when there will be the ramp closures.

6.8 Intersections

6.8.1 Beardsley Road and 83rd Avenue / Lake Pleasant Parkway

The intersection of 83rd Avenue and Beardsley Road will need to be improved from the existing condition. There will be a high volume of right turns from westbound Beardsley Road to northbound Lake Pleasant Parkway in addition to the opposite movement from southbound Lake Pleasant Parkway to eastbound Beardsley. To accommodate the high volume of turn movements, dual right turn lanes will be constructed on westbound Beardsley and dual left turn lanes will be constructed on southbound Lake Pleasant Parkway. There is sufficient pavement width on Lake Pleasant Parkway to accommodate the dual left turn lanes, so additional widening will not be required. There will be impacts to the existing landscaping in the northeast quadrant of the intersection for the Beardsley Road widening for the dual left turn lanes. Impacts will include small vegetation and potentially two mature trees. To minimize the impacts a retaining wall will be constructed for the widening of the roadway for the dual right turn lanes. Currently this intersection has a traffic signal. The mast arms will need to be evaluated during final design and the pole in the northeast quadrant will need to be relocated.

6.8.2 81st Avenue and Beardsley Road

Beardsley Road will continue through the intersection as a 5-lane section. This will include two through lanes and a left turn lane. Right turn lanes will not be included on Beardsley Road. The south leg of intersection, Oraibi Drive, will be a 3-lane section, one through lane in each direction and a right turn lane. The north leg of the intersection, 81st Avenue, will remain one lane in each direction. A new traffic signal will be installed at this location.

It is anticipated that the absence of a right turn lane on Beardsley and no left turn lane on 81st Avenue will discourage cut through traffic. In addition, there will be traffic calming devices constructed on 81st Avenue. A median island will be installed relatively close north and south of the intersection. This will give the driver the presence that they are entering a neighborhood and will need to slow down. In addition, there will be a speed table placed approximately 500-feet north of the intersection. Residents in the neighborhood have expressed interest in traffic calming devices farther north. These two locations will be the only devices included in this project. Residents will need to submit an application through the city and provide funding for additional devices on 81st Avenue.

6.9 Utilities

Utilities anticipated to conflict with construction include light poles, power lines and poles. There is a large high voltage APS power pole that will be in conflict with the proposed alignment of the Beardsley extension. Earlier coordination with APS will be required during final design. There is also a VCP sewer line that will be within the

alignment of the new frontage road. Additional embankment will be placed on the sewer line to establish a profile grade outside the flood plain of New River. During final design it will be determined if the sewer line will require additional protection due to increased embankment. Additional details are provided in the table below.

Table 6.2 – Conflicting Utilities

Utility		Normal	Location	Action
U-1	APS	Power Poles and Overhead Lines	Beardsley Road from 83rd Avenue east to 80th Avenue	Relocate
U-2	APS	Lighting Poles	Beardsley Road from 83rd Avenue to 81st Avenue	Relocate
U-3	City of Glendale	21" VCP Sewer Line	From 75th Avenue, parallel to the north and west side of SR 101L to Union Hills Drive	TBD

TBD - To Be Determined

Additional utility services will be added within the project area. The locations of the new utility services are provided in Table 6.3. Additional coordination with utility providers will be required during the final design phase.

Table 6.3 – New Utility Services

Utility	Type	Location
APS	New street lights on extension	Services to trailhead and undeveloped parcels West of SR 101L
Peoria Water	New water line	Services to the trailhead parcel
Peoria Sewer	New sewer line	Services to the trailhead parcel
Glendale Water	New water line	Services to undeveloped parcels West of SR101L
Glendale Sewer	New sewer line	Services to undeveloped parcels West of SR 101L

Contact information for each utility provider that services the project area is included below:

City of Peoria (Water, Sewer, and Irrigation)	(623) 773-7286
APS (Electric)	(602) 371-5688
Southwest Gas Company	(602) 484-5270
Qwest Communications (Telephone)	(602) 630-5884
Cox Communications (Cable and Fiber Optic)	(623) 328-3516
ADOT	(602) 712-8216
City of Glendale (Sewer)	(623) 930-2000
New River Utility Co. (Water)	(623) 561-1848

6.10 Structures

Two new bridges will be required within the project limits; the "U-Turn" structure located north of the Union Hills interchange and the other on the new Beardsley Road alignment over New River. Structure types proposed for these two locations are used for estimating purposes only. The exact structure type will be determined in final design.

U-Turn Bridge at Union Hills: Three alternatives were evaluated for the "U-Turn" structure to be located just north of the Union Hills Overpass (OP) bridge: 1) Widen existing Union Hills OP bridge for lower speed 90-degree turns; 2) Construct a new separate structure for lower speed 90-degree turns; and, 3) Construct a new separate structure for higher speed larger radius curves. The feasibility and cost have been studied for each case.

The new or widened "U-Turn" structure will need to accommodate one-lane of traffic. It will have two spans to match the existing Union Hills Overpass Bridge. The center pier for the bridge will consider a future HOV lane on SR 101L. The abutments should also be designed to be in line with the existing Union Hills Overpass abutments.

The alternative to widen the existing bridge does not appear to be feasible. The primary factor is that a widened structure would need to match the existing structure type and this alternative would not allow for future widening of the interchange and would cause a deficiency in vertical clearance on SR 101L.

AASHTO Type VI Modified precast girders can be used for the new separate structure alternatives. The primary benefit of using the AASHTO girders would be the elimination of the need for falsework over the freeway traffic. The new stand alone structure will be located to provide a 39-ft horizontal clear separation between structures, in order to accommodate the ultimate widening on the Union Hills Overpass Bridge and in order to allow for construction of the new bridge without impacting the existing. The 39-ft horizontal clear separation includes two lanes of the future widening, a 5-ft bike lane and 10-ft horizontal clear zone for the construction of the future widening of the Union Hills Overpass Bridge.

The use of the AASHTO girders for a curved bridge deck that would allow for higher turning speeds across the structure did not appear to be feasible. The curvature required to allow for free flow of traffic across the structure was too sharp of a radius to be accommodated by the long straight bridge elements. The abutments would have had to move closer to the pier in order to shorten up the span length or a cast-in-place curved bridge would have been required. Therefore, the lower speed option was chosen with the AASHTO girders in order to minimize impacts to the freeway traffic during construction. The bridge deck and layout of the girders will be flared to accommodate the truck turning movements. (see bridge layout Fig 6.2)

For the foundations, the bridge will be supported on walled piers and abutments with spread footings similar to the existing Union Hills Overpass Bridge, which are approximately 5' below existing finish grade.

Beardsley Road Bridge over New River: A three span, 300-ft long, bridge will be required. The structure will carry two-lanes of traffic in each direction with a center turning lane. Cast-in-place post tensioned box girder and steel girder bridge alternatives should be investigated, however, the precast AASHTO girder bridge is likely to be the best selection for this site. There are several reasons that precast girder alternative is preferred, including cost competitiveness and the elimination of falsework in the river channel.

Freeboard of 2-ft for the 100-yr flood will be provided. The elevation of the 100-yr flood will be based on the latest Drainage Design Manual for Maricopa County, Volume II, Hydraulics. Bridge deck drainage will be in accordance with the MCDOT Roadway Design Manual, 2005, and the FCDMC Drainage Design Manual, 1997.

The bridge will be supported on deep drilled shaft foundations to guard against potential scour at the piers and abutments.

6.11 Pedestrians

As part of this project approximately 1,600 feet of the west bank of New River will be channelized. This will allow for a new multi-use path to follow the river bank. There is an existing multi-use path to the south and to the north. This project will complete the continuity of the multi-use path system for this area. The path will cross under the newly constructed New River Bridge. The slopes taking the path below the structure will be designed to meet ADA requirements. The slopes will also need a non-skid surface since the future trailhead will accommodate equestrians.

The existing sidewalk on the north side of Beardsley between 83rd Avenue and 81st Avenue will be reconstructed as a multi-use path. The path will be constructed within the existing right of way. This will provide continuity between the path on 81st Avenue to the south and Lake Pleasant Parkway to the north.

Pedestrian access will not be permitted on the New River Bridge or along the frontage road. Facilities will not be included to encourage pedestrian traffic within these areas.

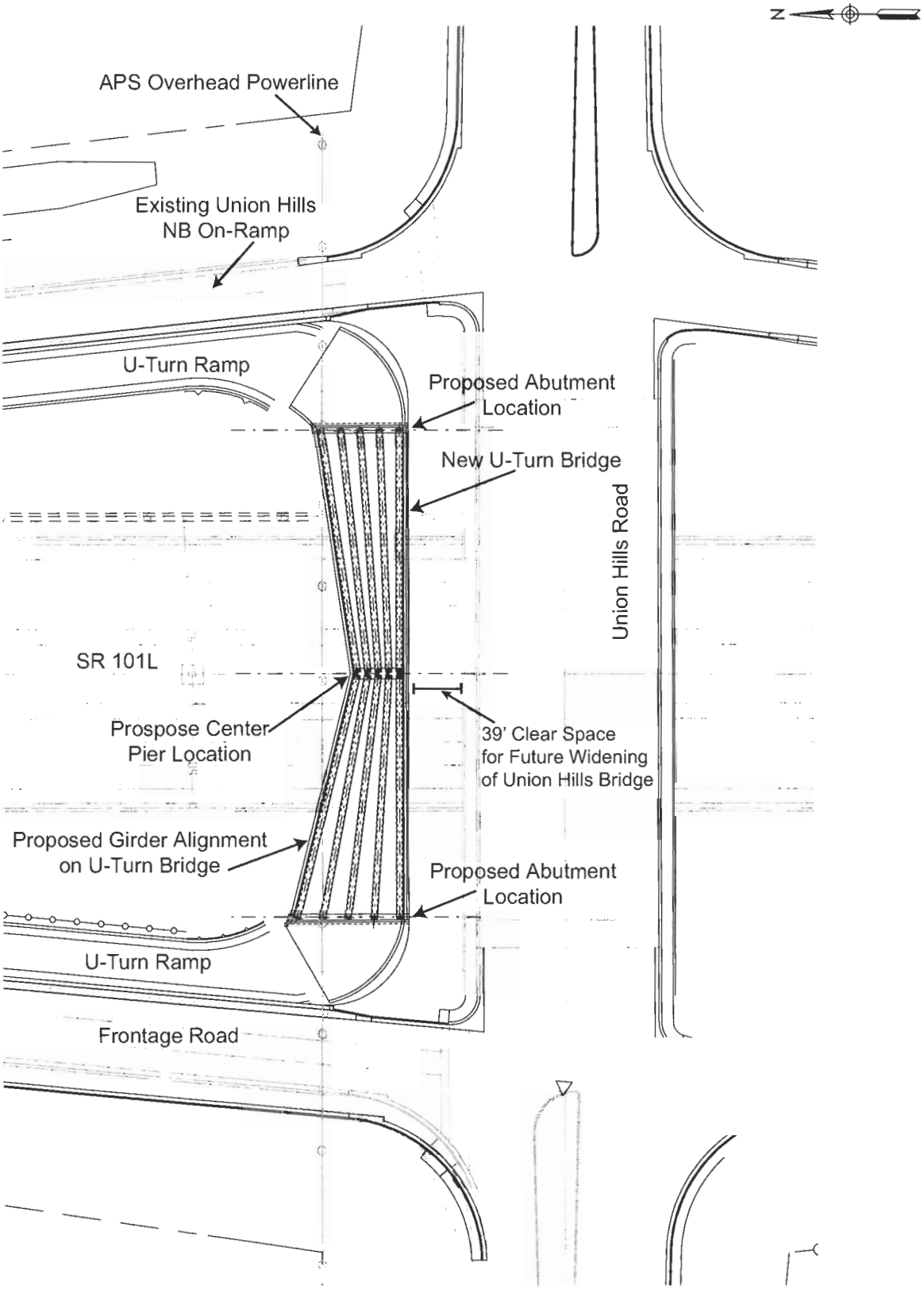

Figure 6.3
U-Turn Bridge Girder Layout

6.12 Trailhead

A proposed trailhead will be located at the southeast corner of Beardsley Road and 81st Avenue. This site is designated to include a trailhead to accommodate both equestrian and bicycle users. The trailhead will serve as a major link to the existing trail systems and public transit in the area as well as a gateway opportunity for both the City of Peoria and the City of Glendale. Primary Trail improvements should be developed on both sides of the river corridor including an underpass, primary staging areas, public art opportunities and neighborhood connections. The trailhead will be located at the southeast corner of Beardsley and 81st Avenue. Access to the trailhead will be from 81st Avenue only.

The character of the trailhead will demonstrate the rich diversity of Sonoran Desert native plants organized to provide habitat for wildlife indigenous to the region. Vistas of the mountains should be maintained while noise pollution is mitigated through physical buffers.

The Trail Head will feature five (5) - eighteen by forty seven foot parking spaces for equestrian trailers, twenty (20) - nine by twenty-foot car parking spaces along with two (2) ADA accessible spaces. The features of the Trail Head include two 18'x18' Ramada's by Classic Recreation (Denver Model or approved equal). The structures must be located in a manner so that they do not interfere with the overhead power lines. Each eighteen by eighteen foot Ramada will have a charcoal BBQ located in close proximity of the structure. There will also be an eight seat picnic table with an accessible seat at the end of the table.

Also at the trailhead is a restroom facility with male and female accommodations. In close proximity should be a drinking fountain with ADA accessibility and integrated dog water drinking fountain at the base. There will also be a dog-waste disposal station located next to the restroom facilities. Up to twelve bikes can be secured in the racks provided adjacent to the restrooms.

In the primary equestrian staging area a fifty-foot lunge pen and hitching post will reside. There will be several eighteen-inch high mounting blocks next to the hitching post to assist in mounting horses. There will also be a trough with a manual water fill assembly to water and a staging area to prep for a ride.

The parking lot will be asphalt and signed to designate the location of the amenities. Quick couplers will be provided at each end of the equestrian parking lot, and at each Ramada to assist in maintaining the amenity space.

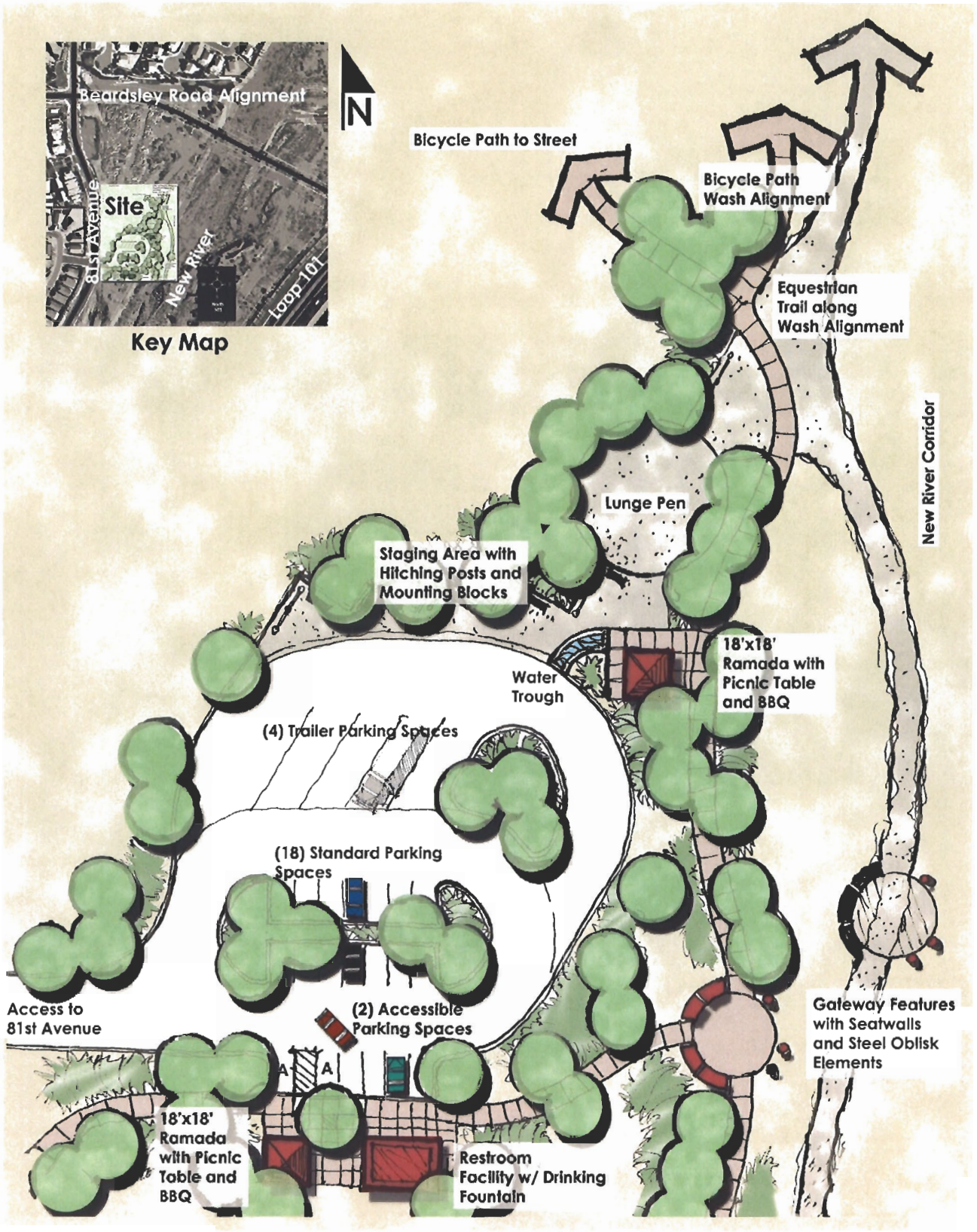

Figure 6.4
Trailhead Schematic

6.13 Pavement Design

The pavement surface throughout the project limits will be asphalt concrete (AC). The recommended pavement structural section will be 6-inches of dense graded AC over 8-inches of Aggregate Base. This section will include a 1-inch surface course of Asphalt Rubber - Asphalt Concrete Friction Course (AR-ACFC).

6.14 Roadway Signage

6.14.1 SR 101L

Roadway signage will be critical on this project. With the reconfiguration of the 75th Avenue on-ramp and the Union Hills off-ramp it will be important to provide advanced signing so motorist will maneuver in the proper lane assignments well in advance. The existing auxiliary lane between 67th Avenue and 75th Avenue will be extended to the new off-ramp west of the 75th Avenue overpass. The new off-ramp will service both Beardsley Road and Union Hills Drive. Signing should be replaced 2 miles in advance for the new off-ramp. Additional signing will be required shortly after the 67th Avenue on-ramp advising motorist of the 75th Avenue off-ramp and the Beardsley Road and Union Hills Drive off-ramp. Additional signing should be provided at the 75th Avenue off-ramp advising motorists of the new off-ramp for Beardsley Road and Union Hills Drive.

6.14.2 Frontage Road

Advanced signing on the frontage road will be required to alert motorist and allow them to maneuver into the proper lane assignments. Signing will be evaluated just west of the new Beardsley Road and Union Hills Drive off-ramp. This will establish lane assignments well in advance of the Beardsley intersection. Additional signing will be required south of the Beardsley intersection. There are four lanes within this section and some vehicles will need to maneuver two lanes fro the proper lane assignment. South of the new on-ramp signing will be required to identify the U-Turn and Union Hills Drive. The locations of signs should be designed to achieve visibility through controlling gaps between the signs while making sure that adequate decision-making distances are maintained. Signs will be in accordance with ADOT standards on the frontage road.

6.14.3 Beardsley Road

On the New River structure signing should be evaluated for vehicles accessing the frontage road. Signing should indicate that vehicles traveling to southbound SR 101L will be in the inside lane while vehicles traveling to northbound SR 101L or Union Hills Drive should be in the outside lane.

6.15 Roadway Lighting

Roadway lighting has been included throughout the project. New lights will be installed along the Beardsley Connector and the frontage road. The existing lighting along Beardsley Road should be evaluated to determine if modifications are required.

Standard interchange lighting will be provided at the new ramps. Lighting along the frontage road, interchanges, and the "U-Turn" structure will meet ADOT standards. The lighting along Beardsley up to the frontage road will meet City of Peoria standards.

6.16 Landscaping

Landscaping will be required along Beardsley Road. The project will impact the Fletcher Heights channel. Mature trees may be considered within the channel area to help improve the aesthetics of the roadway for the nearby residents. There are currently mature palm trees east of the 81st Avenue intersection that should be transplanted in the vicinity.

The existing vegetation between the Union Hills Drive off-ramp and SR 101L will be removed as a result of the project. With the extent of retaining walls in this area there will be limited room to plant new vegetation. There will be sufficient space between the frontage road and SR 101L. ADOT has expressed interest in including landscaping within this area.

6.17 Design Exceptions

There will be no design exceptions needed for this project.

7.0 COST ESTIMATES AND IMPLEMENTATION

7.1 Cost Estimate Summary

The concept-level cost estimate for construction of the Recommended Alternate is $15,348,647 as follows: (Appendix 9.3 – For Detailed Cost Estimate)

Beardsley Road (83rd – 81st Avenues)	$340,822
Fletcher Heights Channel	$515,499
Beardsley Road (81st Ave to Frontage Road excluding bridge)	$3,955,688
New River Structure	$2,356,000
Southbound Frontage Road With Ramps	$4,823,321
"U-Turn" Ramp	$1,632,706
"U-Turn Structure	$1,000,000
Northbound Ramp	$724,611
Project Construction Cost	$15,348,647
Project Right of Way Cost	$5,219,000
Project Engineering Cost	$1,200,000
Total Project Cost	$21,767,647

Cost is based upon unit prices obtained from ADOT's Construction Cost Data Base and from bid tabs of recent City of Peoria advertised projects. Previous unit cost of asphalt products may not be representative of future unit costs due to fluctuating costs of crude oil. $450/Ton for Asphalt Cement Material and $38/Ton for placement of the AC pavement was used for estimating the $85/Ton for the unit cost of the Asphalt Concrete. Pavement costs are also based on the following pavement structural sections:

Beardsley Road (83rd Avenue to Loop 101 Frontage Road):

½"	AR-ACFC
6"	AC
8"	AB

Southbound Frontage Road With Ramps, U-Turn Ramp with Structure and Northbound Ramp:

½"	AR-ACFC
4 ½""	AC
8"	AB

The lump sum amount of $500,000 for the cost for relocation of the high voltage power pole at the southeast corner of 81st Avenue and Beardsley Road was obtain from Arizona Public Service Company (APS). The unit price of $100/ft² used for the cost of the two bridges was estimated from recently constructed bridges in the Phoenix area.

There is a total acquisition of 20 acres required for this project at an average acquisition cost of $6/sq. ft., the total right of way cost is estimate to be $5,219,00.

8.0 SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

8.1. Natural Environment

8.1.1 Vegetation

A biological review has been prepared to identify vegetation communities located within the project area. No sensitive plant species have been identified within the vicinity of the project. Although removal of desert scrub vegetation is anticipated as part of the project construction activities, it is not anticipated that the project will permanently impact habitat corridors or connectivity.

8.1.2 Wildlife

The Arizona Game and Fish Department (AGFD) provided a list of Wildlife of Special Concern in Arizona for consideration during the environmental analysis process for this project. The AGFD identified the Western burrowing owl (*Athene cinucularia hypugaea*) as having the potential to occur within a 2-mile buffer of the project area. The AGFD identified no critical habitat within the immediate project area.

A burrowing owl survey will be conducted during the final design phase (within 6 months prior to beginning of construction) of the project to determine potential occurrence within vicinity of the project. If burrowing owls are identified during the survey, mitigation will be required and may include establishing or developing temporary nesting areas outside of the project area.

The biological review determined that the project will not affect any sensitive species or their habitat.

8.1.3 Invasive Species

Based upon "Executive Order 13112" on invasive species, dated February 3, 1999, all projects will, "...subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: i) prevent the introduction of invasive species; ii) detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner; iii) monitor invasive species populations accurately and reliably...[and] iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded...."

An initial review of the project area determined that there are no listed invasive species present within the project limits. Therefore, this project will not result in the spread of invasive species. To prevent the introduction of invasive species, all earthmoving and hauling equipment will be washed at the contractor's storage facility prior to entering the construction site. In addition, all disturbed soils that will not be landscaped or otherwise permanently stabilized by construction will be seeded using species native to the project vicinity.

During the final design phase of this project, a final invasive species survey should be conducted within 6 months prior to beginning of construction.

8.1.4 Wetland and Riparian Areas

There are no wetlands within the project area; therefore, there will be no impact to wetlands as a result of this project. Sparse riparian vegetation does exist within the project area; however, the project activities are not anticipated to disturb dense clusters of vegetation and will not change the overall vegetation character of the area.

8.1.5 Visual Impacts

Temporary visual impacts may include the siting of construction equipment and the glare from nighttime construction lighting. Potential permanent impacts include the new bridge, new roadway, noise walls, and vegetation removal. A qualitative visual assessment would be required to address this impact as well as identify other potential visual impacts. Efforts have been made during preliminary design to mitigate visual impacts such as bridge heights and roadway profile elevations. These mitigations should be maintained or enhanced during final design.

8.1.6 Cultural Resources

A cultural resources survey report was completed for the proposed project. The survey is entitled, *A Cultural Resources Survey of 57.85 Acres of Private Land along New River for the Proposed Beardsley Road Extension between 81st Avenue and the State Route 101 Loop, Maricopa County, Arizona.* No cultural sites were identified within the survey area. In addition to conducting the survey, a background and literature review was conducted to identify previously recorded cultural resource sites and historic properties, historic resources, and previous

cultural resource investigations within the Area of Potential Effect (APE) and a surrounding 1-mile radius. The literature review identified 14 previous cultural studies and six previously recorded cultural sites within a one-mile radius of the APE. Only one of those cultural sites was located within the APE; however this site was destroyed during previous ground disturbing activities, possibly associated with gravel mining.

No further cultural resources work is anticipated for the APE. If previously unidentified cultural resources are encountered during activity related to the construction of the project, the contractor shall stop work immediately at that location and shall take all reasonable steps to secure the preservation of those resources. Concurrence with the State Historic Preservation Office is required. **(Appendix 9.8 – Cultural Resources Study)**

8.2. Physical Concerns

8.2.1 Noise

Sensitive noise receivers include homes and businesses adjacent to Loop 101 and along the Beardsley Road alignment. A detailed noise analysis using the FHWA Traffic Noise Model (TNM) was conducted by Higgins & Associates. There was an original analysis completed along Beardsley Road in the vicinities of 83rd Avenue and 81st Avenue. There were 23 receptors placed within the residential area that were evaluated. The analysis results ranged from 43 dBA to 62 dBA for the existing condition. The future build condition ranged from 54 dBA to 64 dBA. Based on the evaluation noise abatement is not required. **(Appendix 9.9 – Noise Study)**

A supplemental noise analysis was completed along the east side of SR 101L in the Arrowhead Ranch area. There were 25 receptors placed along east of SR 101L between Union Hills Road and 75th Avenue. The analysis results ranged from 60 dBA to 67 dBA for the existing condition. The future build condition ranged from 62 dBA to 67 dBA. Based on the evaluation noise abatement should be reviewed in the locations where decibel levels exceed 64 dBA.

8.2.2 Air Quality

Both the City of Peoria and the City of Glendale are located in an area that exceeds the national ambient air quality standards for particulate matter (PM10), carbon monoxide (CO), and ozone (O3). Short-term impacts to air quality would most likely occur during the construction phase from construction equipment. This access improvement project is anticipated to alleviate some traffic congestion, which may improve air quality in the long term. The project is included in the Maricopa Association of Governments (MAG) air quality conforming transportation improvement program (TIP).

If changes are made to this project that would result in additional long-term air quality impacts, then these impacts must be addressed in a regional emissions analysis and consequent TIP amendment, as required by Federal Regulations and Arizona Statutes. **(Appendix 9.10 – Air Quality Study)**

8.2.3 Hazardous Materials

A hazardous materials site assessment did not identify sites which pose significant risk of subsurface impacts; however, the contractor should be notified of the possibility of the presence of buried debris. The analysis was conducted by Ninyo and Moore. **(Appendix 9.11 – Initial Site Assessment)**

8.2.4 Arizona Pollutant Discharge Elimination System

An Arizona Pollutant Discharge Elimination System (AZPDES) general permit is required for projects resulting in 1 or more acres of ground disturbance on non-tribal lands. The proposed project will result in more than 1 acre of ground disturbance; therefore, an AZPDES general permit and stormwater pollution prevention plan will be required.

8.2.5 Clean Water Act Sections 404 and 401

Project construction activities will take place within jurisdictional waters of the US. An individual 404 permit (Permit No. 1999-16449-SDM) was completed and approved by the US Army Corps of Engineers (Corps) for the section of New River within the project area as part of the Middle New River Master Plan. However, the current 404 permit stipulates that additional crossings over New River require a new 404 permit and Section 401 water quality certification. Obtaining the permit and certification from the Corps will typically take 9-months and is required before any ground-disturbing construction activities may begin within the New River channel.

Once the Design Concept Report is completed the 404 permit and 401-certification process will begin. The existing jurisdictional delineation (JD) was completed in February 2000 and will need to be updated by means of a 1-2 page report and photo log. A Corps-approved updated JD and 60% project design plans will be needed to complete the 404 permit and 401 certification applications.

8.3. Socioeconomic

8.3.1 Residential / Commercial Development and Displacement

The project area consists of residential and commercial development and undeveloped land adjacent to the Loop 101 and Beardsley Road corridors. The proposed project is not anticipated to displace any existing residential or commercial developments.

8.3.2 Temporary and Permanent Access

New right-of-way (R/W) will be required for the construction of this project along Beardsley Road and Loop 101.

8.3.3 Neighborhood Continuity / Community Cohesion

The Middle New River Master Plan proposes new multi-use trails, which fall within the construction area of the project. This project will consider and follow the guidance of the Middle New River Watercourse Master Plan in order to avoid conflicts with multi-use trails development.

8.3.4 Title VI / Environmental Justice

According to Census 2000 data, the population in the City of Glendale was 218,812 and the population in the City of Peoria was 108,364. Minorities make up approximately 25% of the total population in the City of Glendale and approximately 15 % of the total population in the City of Peoria. Census 2000 data for Maricopa County show that minorities make up approximately 23% of the total county population. The minority population in the City of Glendale measures relatively similar to that of the County. The City of Peoria contains a relatively smaller percentage of minorities compared to the County.

Typical environmental justice concerns involve temporary, adverse, or permanent effects on any businesses, residents, or landowners as a result of this project. These can include effects to access, relocations, and neighborhood continuity. Currently, no populations protected under Title IV of the Civil Rights Act of 1964 or Executive Order 12898 on Environmental Justice are present within the project area. Since no population displacement will result from this project, no impacts are anticipated for low-income or minority populations.

8.4. Consultation/Coordination

8.4.1 Coordination

Coordination with the following agencies is required:

- SHPO – Cultural concurrence
- ADOT – Utility crossings
- Southwest Gas – Utilities
- APS – Utilities
- US Army Corps of Engineers – 404 permit and 401 certification

8.4.2 Public Involvement

A total of six public meetings were conducted during the development of the Design Concept Report. Two meetings were held and invited City of Peoria residents, two meetings were held and invited City of Glendale residents, and two meetings invited a combination of Peoria and Glendale residents. These meetings allowed for public to provide input and comments on the proposed project. In addition, there were several meetings with Home Owner Associations, residential groups and individual phone conversations.

APPENDIX

9.1 PLANS FOR RECOMMENDED ALTERNATIVE (Alternative 2)

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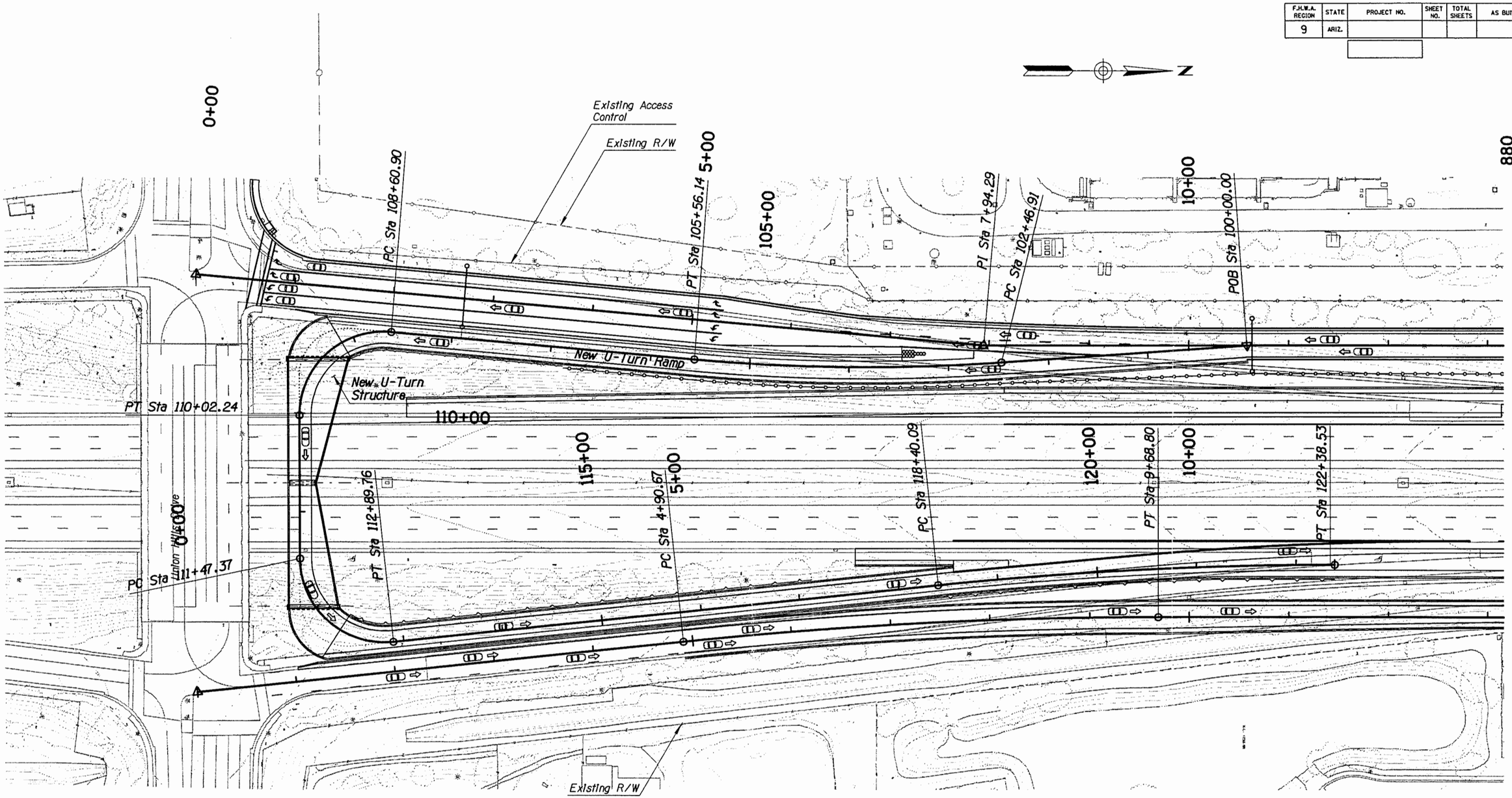

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Carter & Burgess

CITY OF PEORIA

ALTERNATIVE 2
PLAN SHEET
RECOMMENDED ALTERNATIVE

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	SHEET OF
101 L	BEARDSLEY ROAD CONNECTOR	
TRACS NO.		___ OF ___

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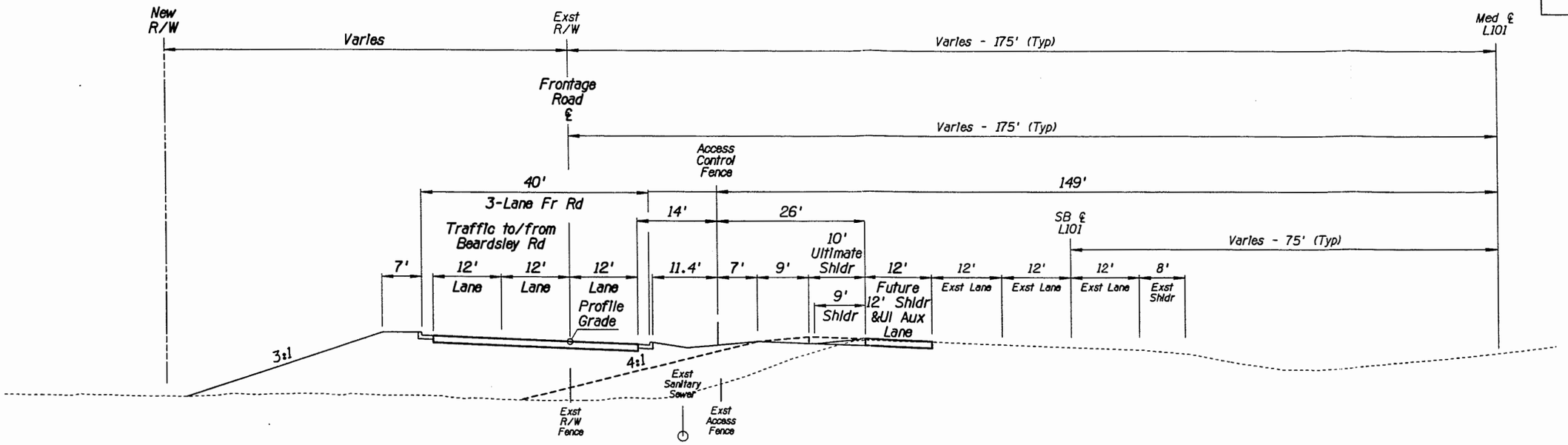

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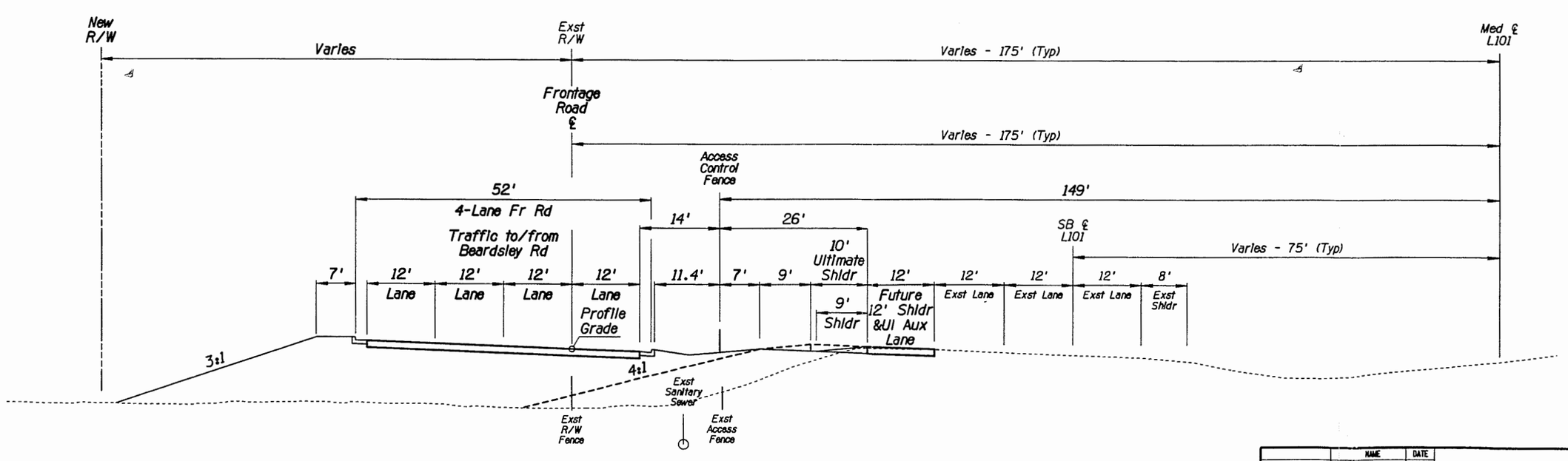

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FRONTAGE ROAD W/FOUR LANES

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CITY OF PEORIA

TYPICAL SECTIONS

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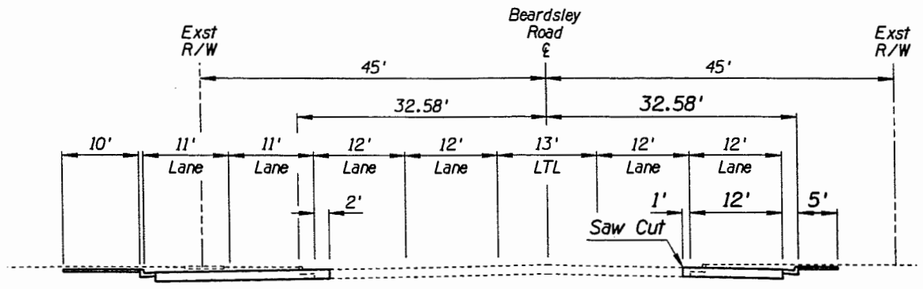

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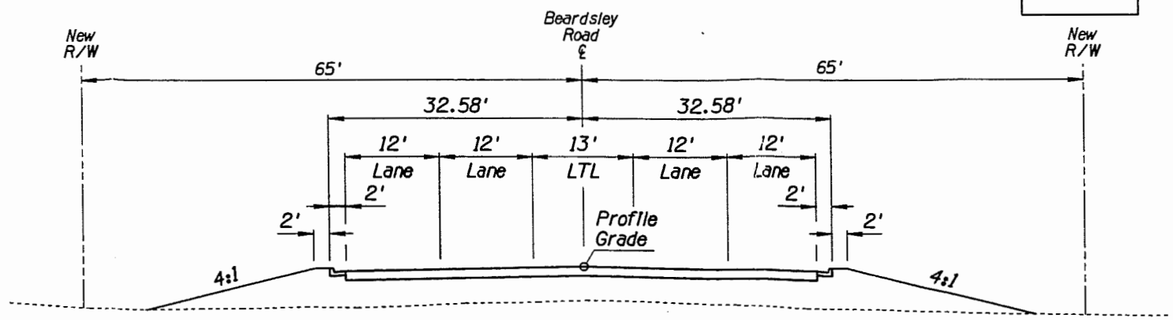

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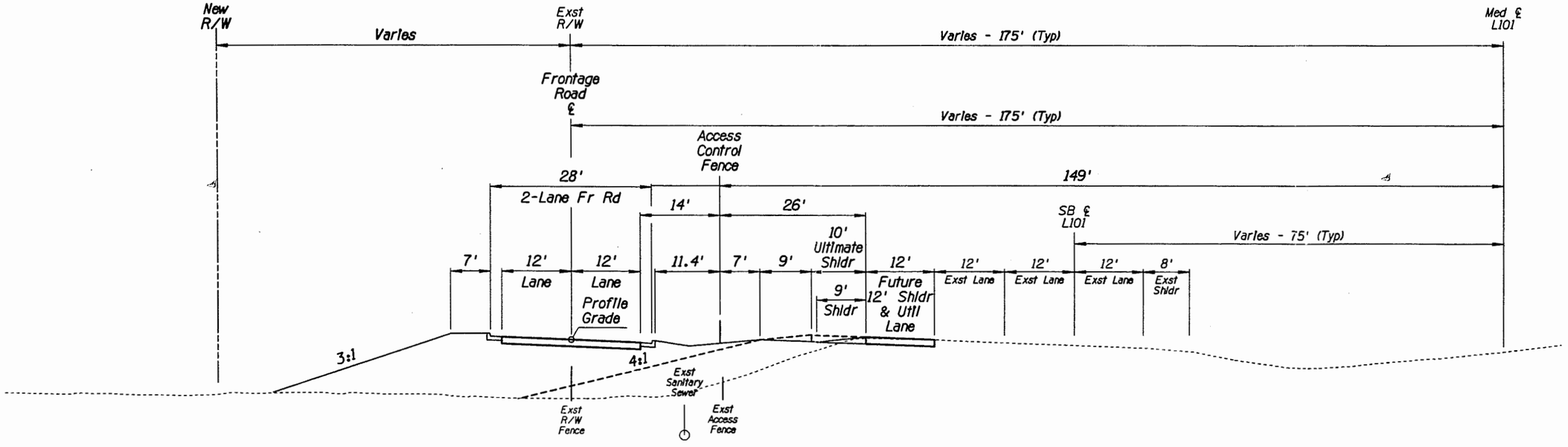
(81st Ave to Fr Rd)



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TYPICAL SECTIONS

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Existing Access Control

Existing R/W

New Access Control

15+00

PC Sta 0+00.00

20+00

PT Sta 4+14.79

5+00

PC Sta 7+40.51

PC Sta 23+79.29

96'

25+00

New R/W

10+00

PC Sta 11+31.79

New SB On-Ramp

15+00

SR 101L

20+00

PC Sta 21+03.77

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Existing R/W

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CITY OF PEORIA

ALTERNATIVE 2 .
PLAN SHEET
RECOMMENDED ALTERNATIVE

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Review
NOT FOR CONSTRUCTION OR RECORDING

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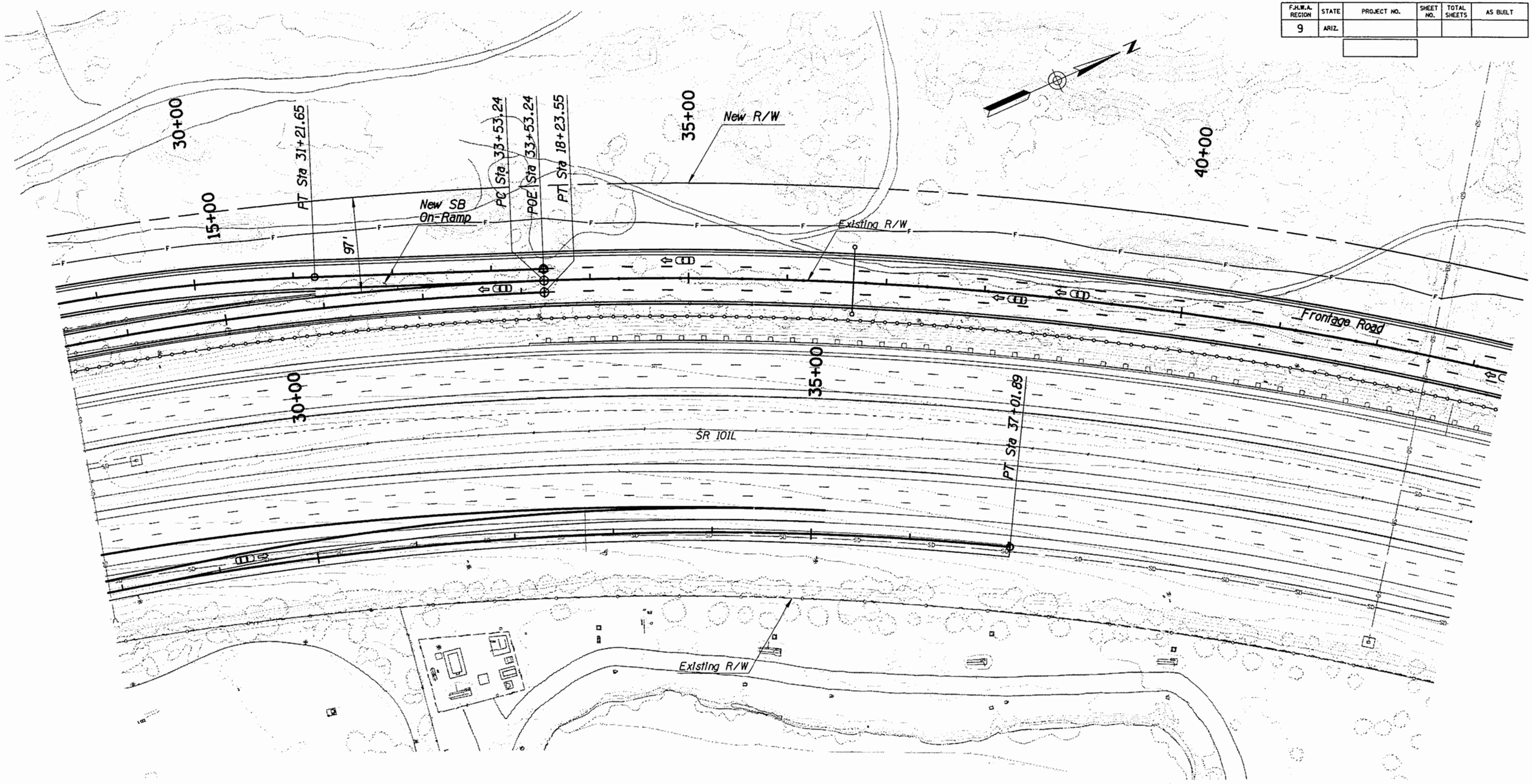

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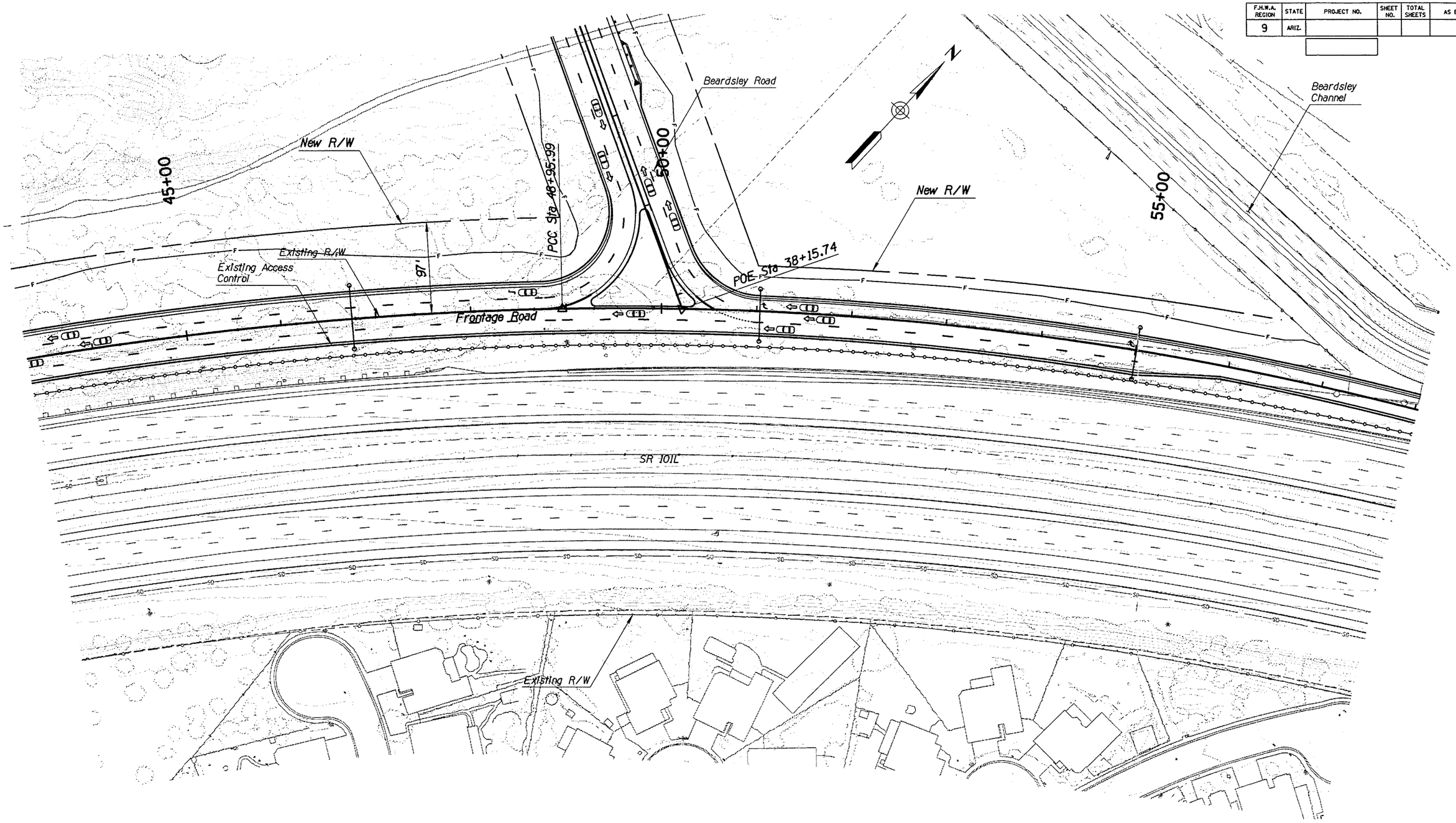

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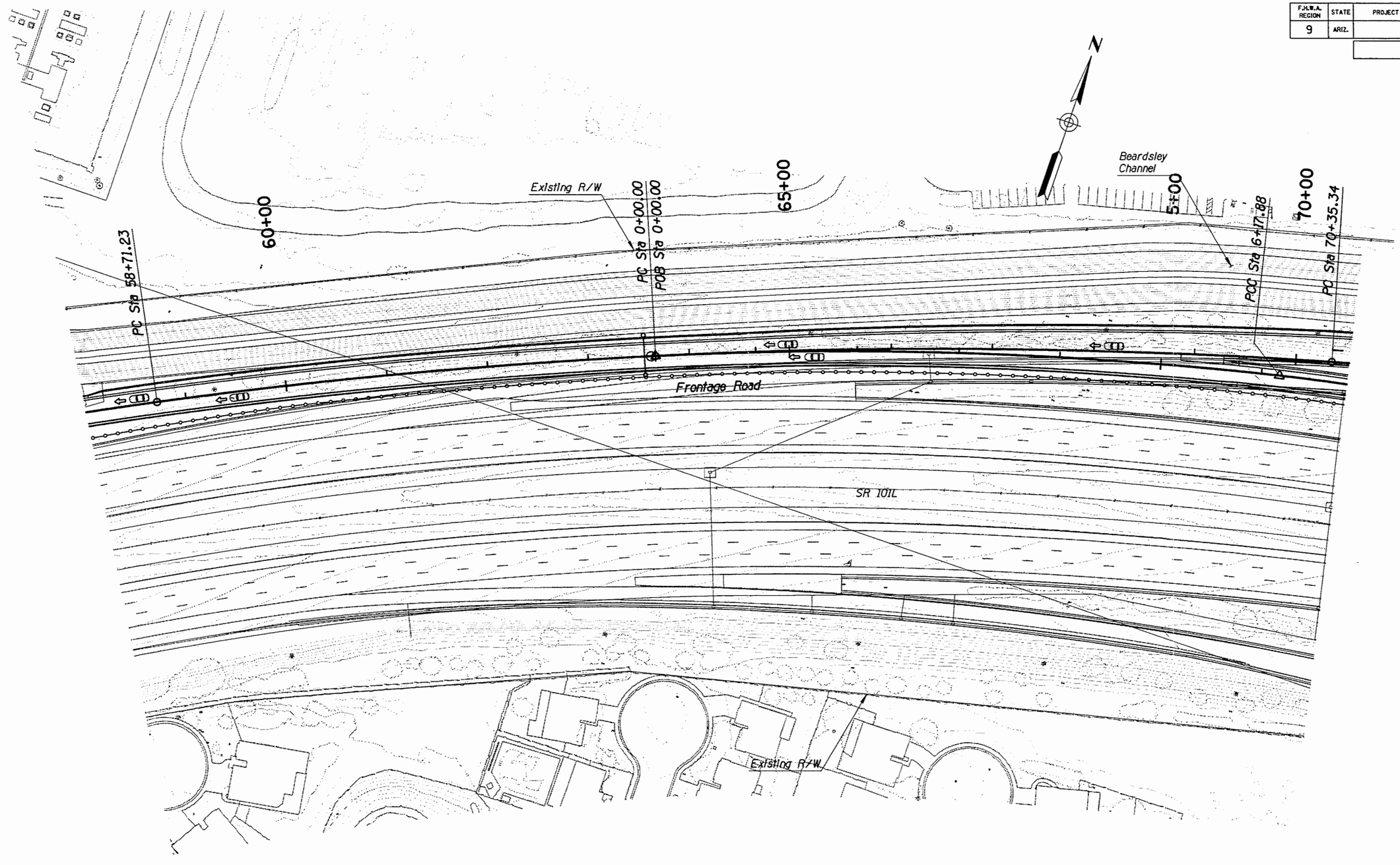

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Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

TRACS NO.

SHEET OF ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO. | DATE-

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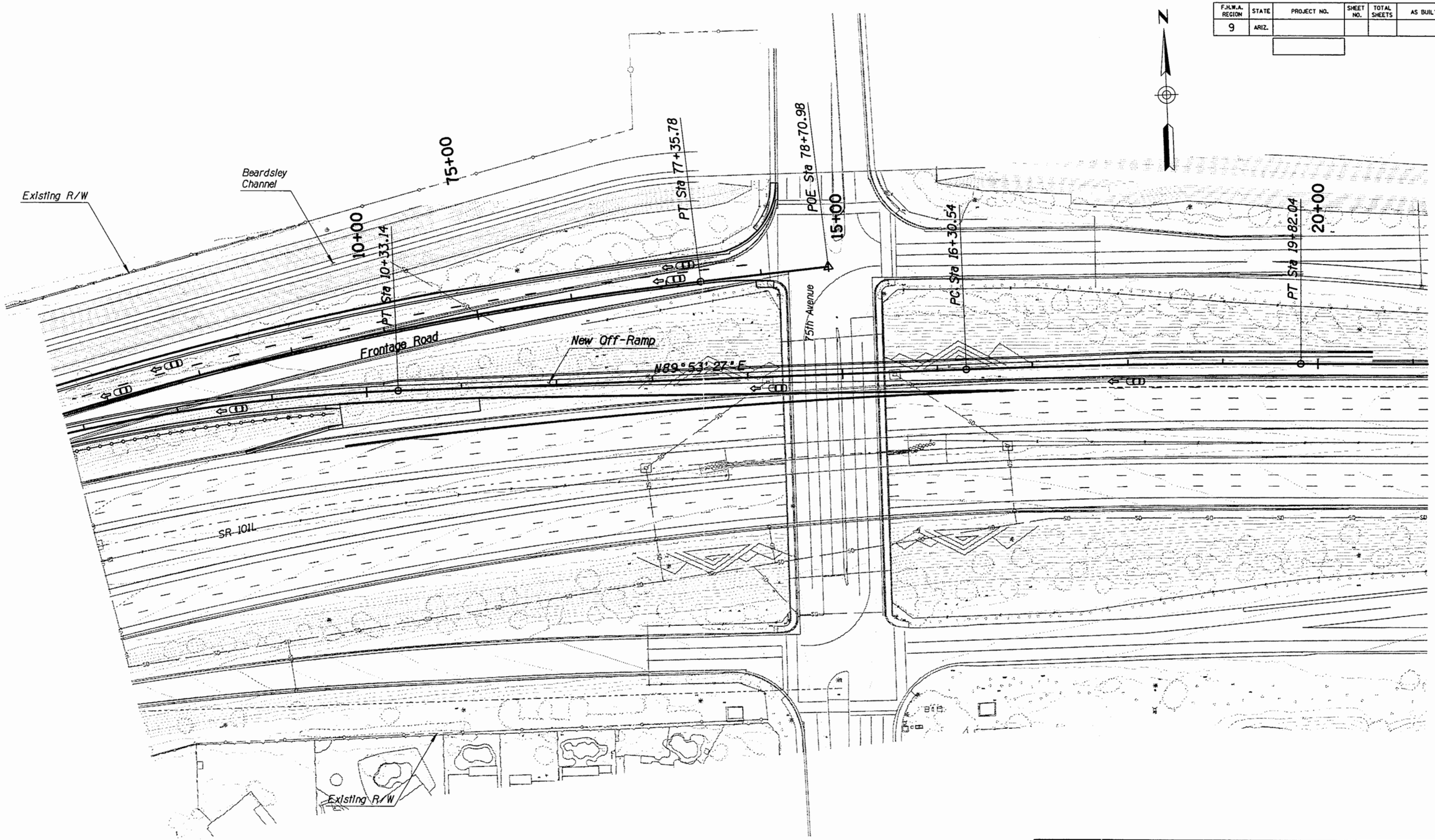
9	ARIZ.				



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DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter::Burgess

CITY OF PEORIA

ALTERNATIVE 2
PLAN SHEET
RECOMMENDED ATERNATIVE

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	SHEET OF
101 L	BEARDSLEY ROAD CONNECTOR	
TRACS NO.		___ OF ___

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

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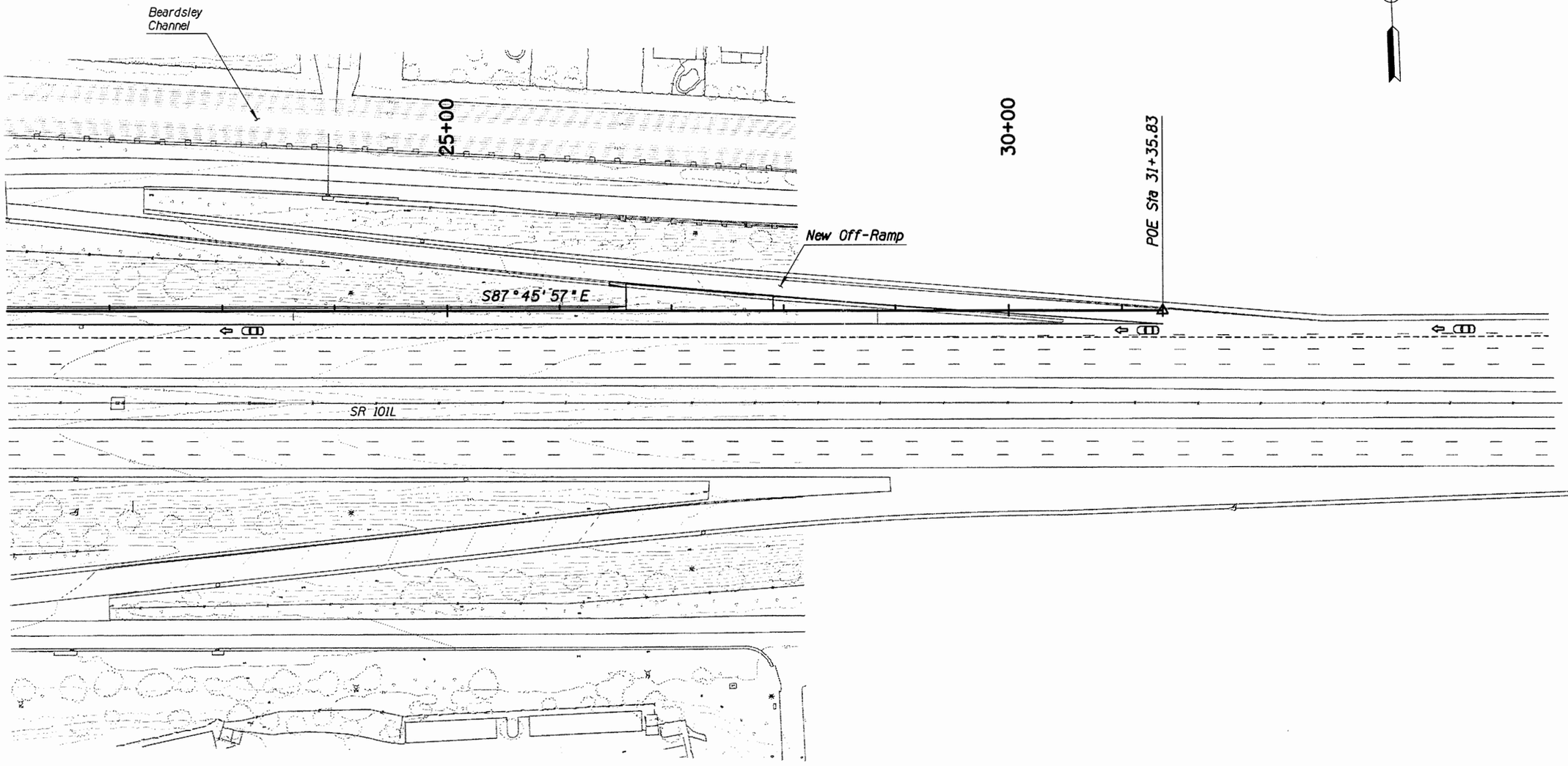

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DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter Burgess

CITY OF PEORIA

ALTERNATIVE 2
PLAN SHEET
RECOMMENDED ATERNATIVE

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

TRACS NO.

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

SHEET OF ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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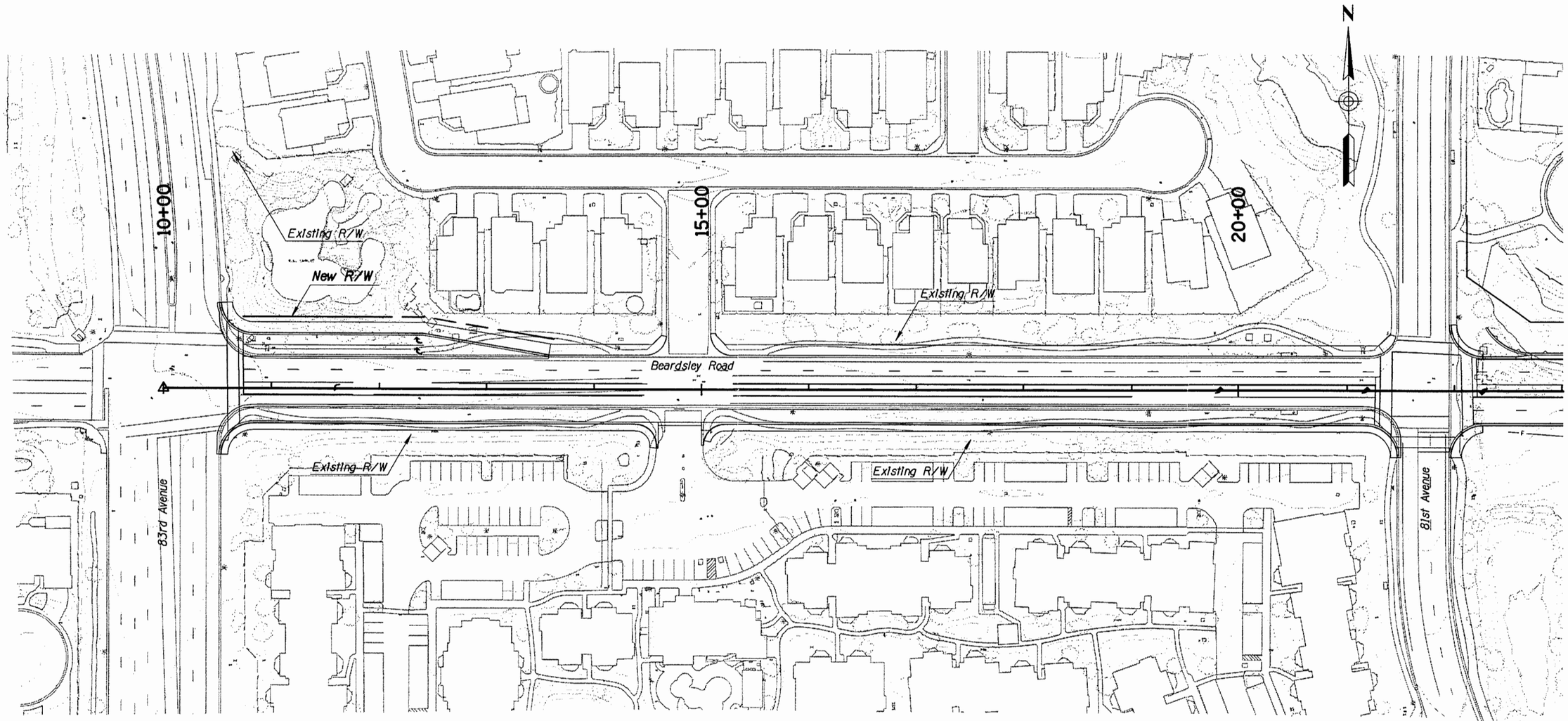

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DRAWN	PNB & DEM	10/05
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Carter Burgess

CITY OF PEORIA

ALTERNATIVE 2
PLAN SHEET
RECOMMENDED ALTERNATIVE

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

TRACS NO.

SHEET OF
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DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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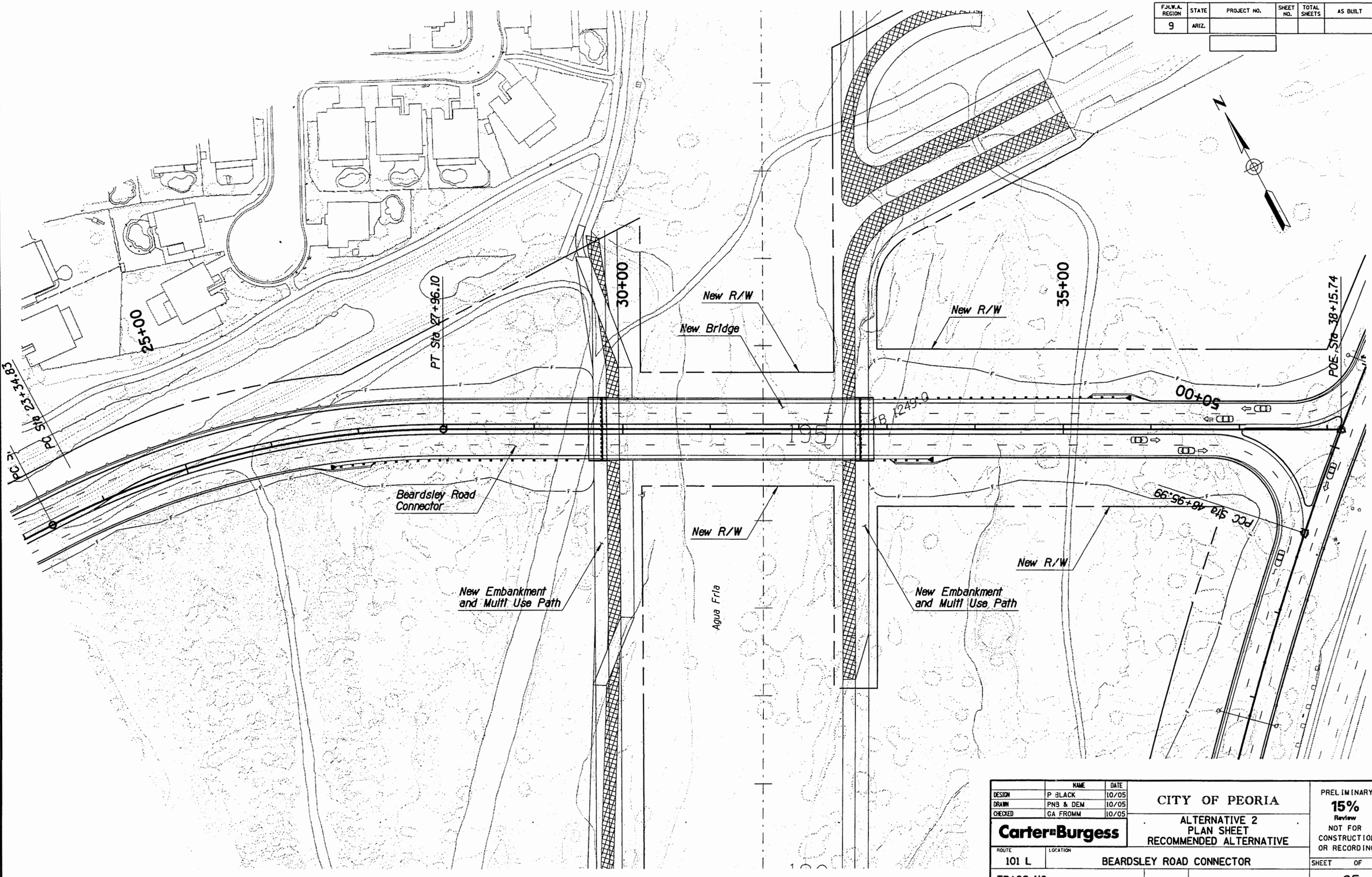

	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

CITY OF PEORIA

Carter Burgess

ALTERNATIVE 2
PLAN SHEET
RECOMMENDED ALTERNATIVE

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	SHEET OF
101 L	BEARDSLEY ROAD CONNECTOR	
TRACS NO.		OF

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

N

865

870

875

880

POB 865+94.28

Existing R/W

Existing Access Control

New Braided Ramp Structure

PI 878+00.00

New U-Turn Structure

New U-Turn Ramp

SR 101L

Union Hills Drive

Curb & Gutter Location for Future L101 Widening

Existing R/W

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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	NAME	DATE
DESIGN	P BLACK	10/05
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Carter Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

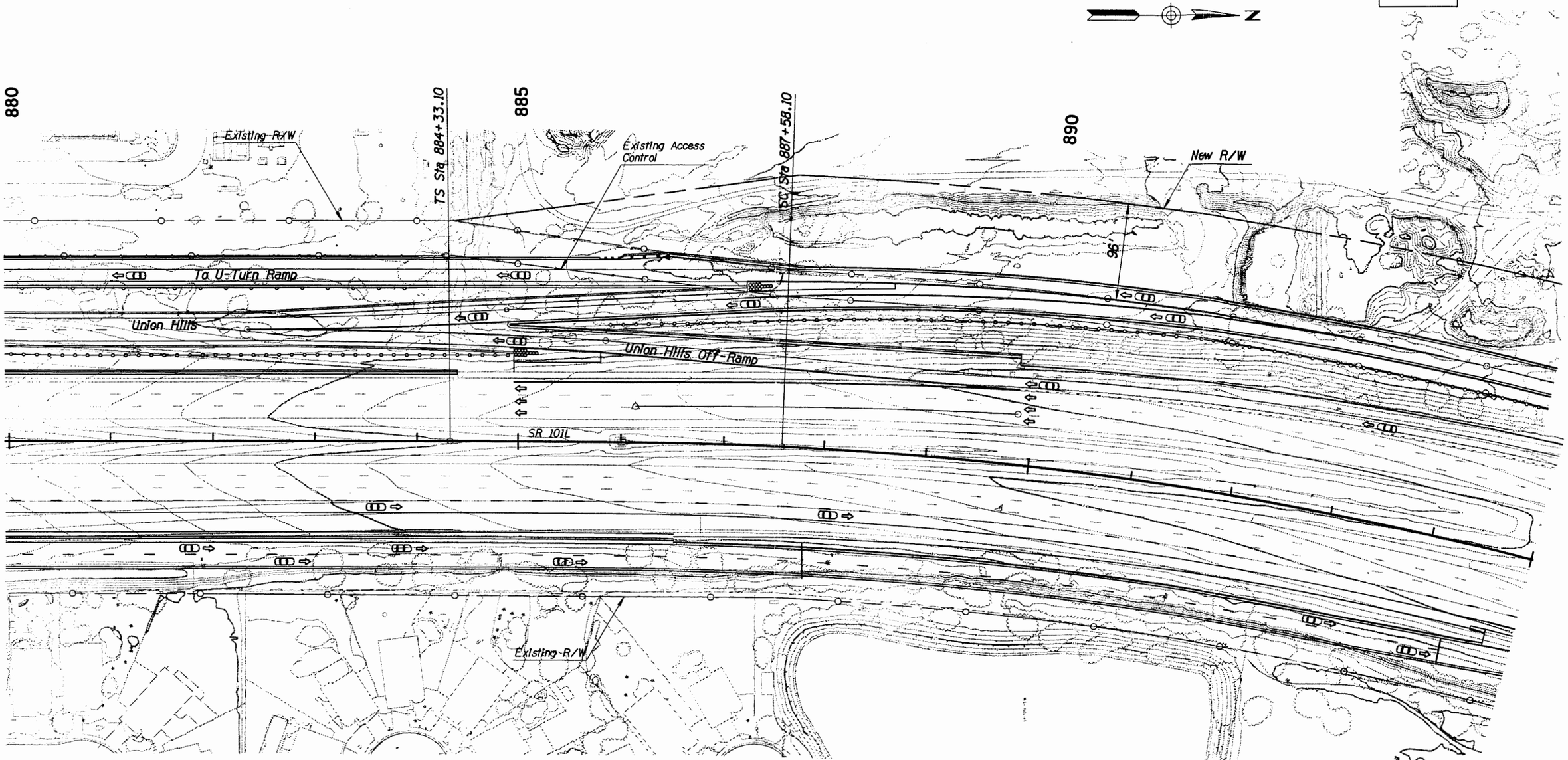
ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

SHEET OF

TRACS NO.

___ OF ___

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



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Carter-Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

TRACS NO.

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

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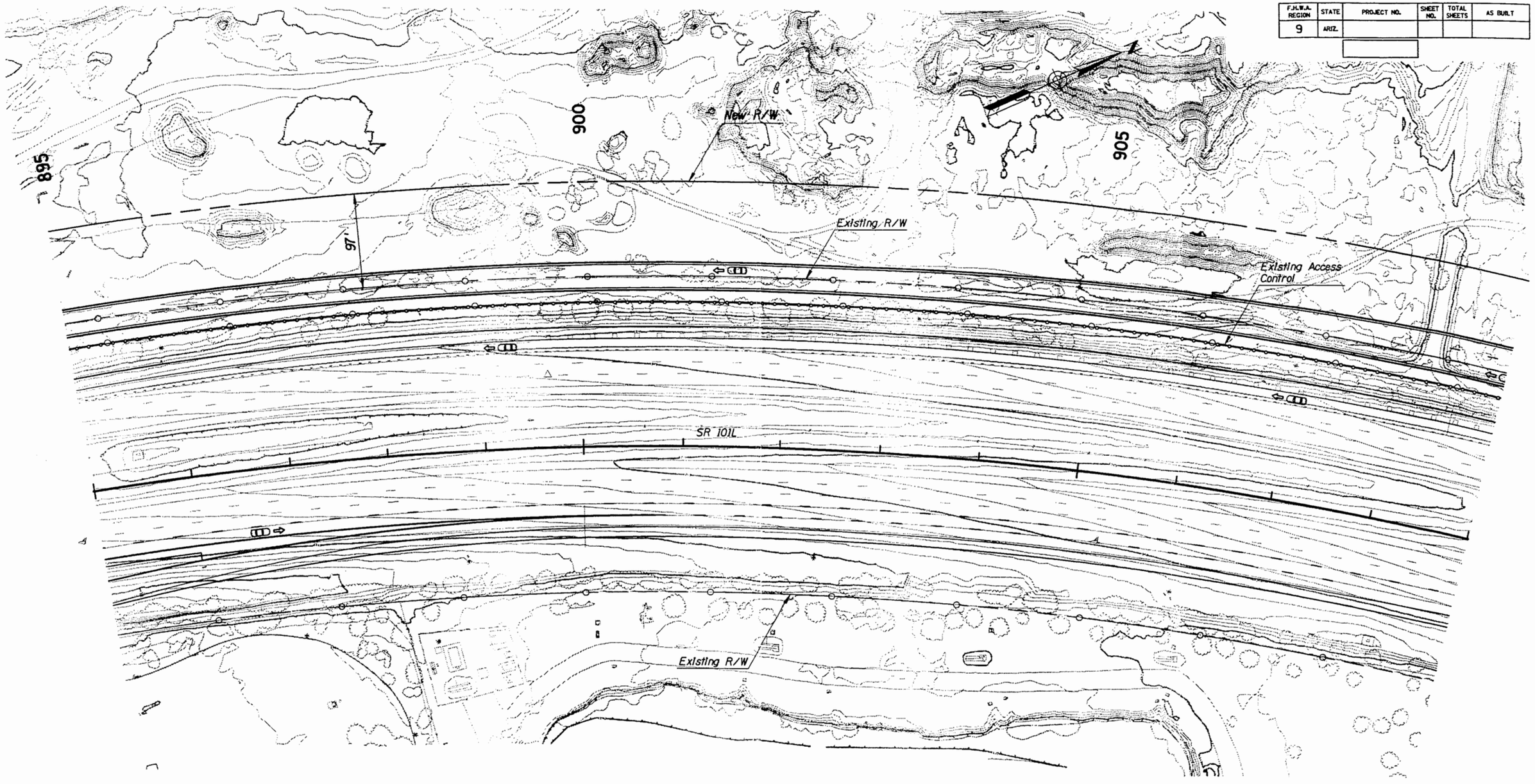
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



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DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter-Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

TRACS NO.

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

SHEET OF ___ OF ___

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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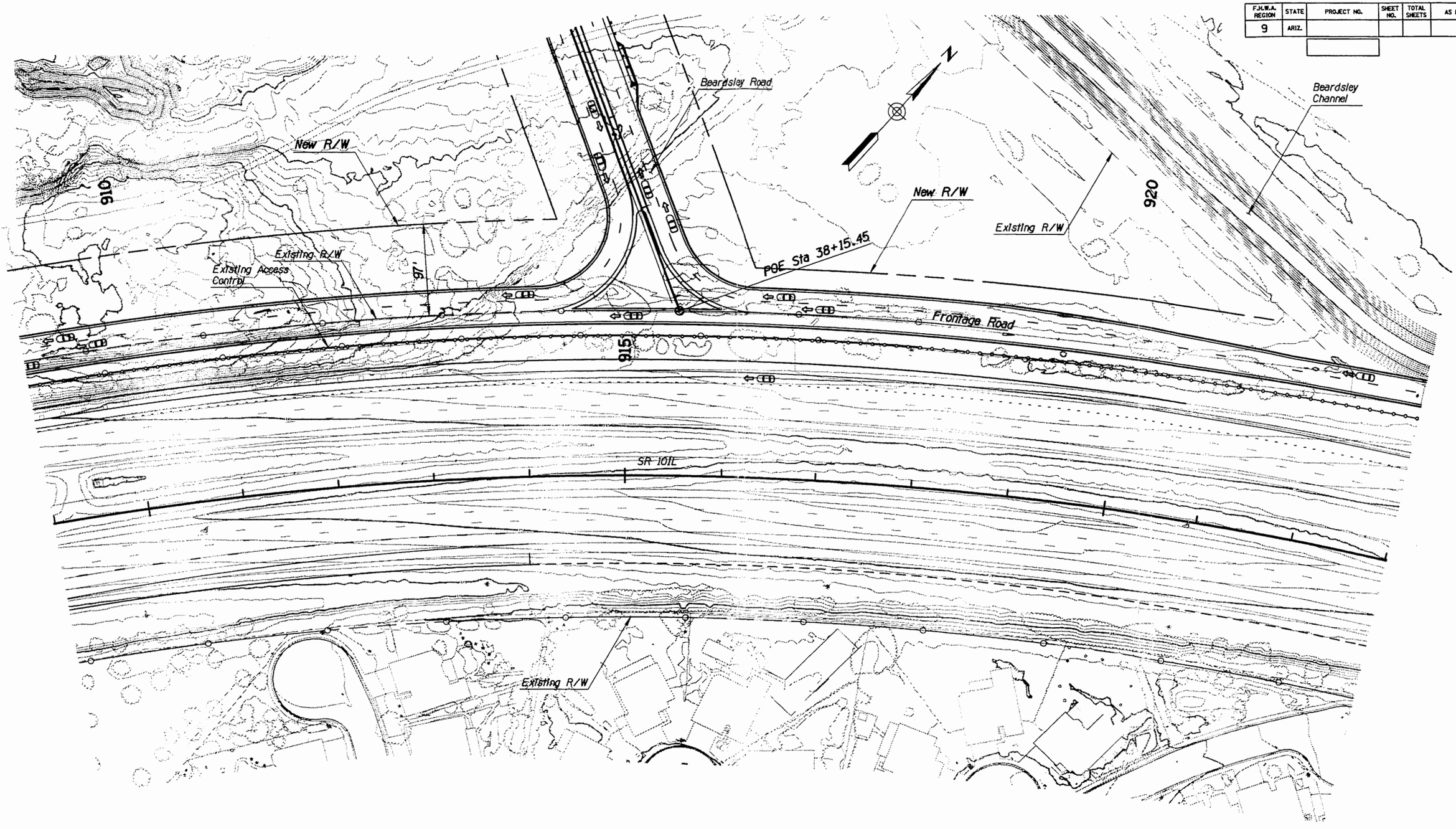
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



	NAME	DATE
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Carter & Burgess

CITY OF PEORIA

ALTERNATIVE I
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

SHEET OF

TRACS NO.

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SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO.

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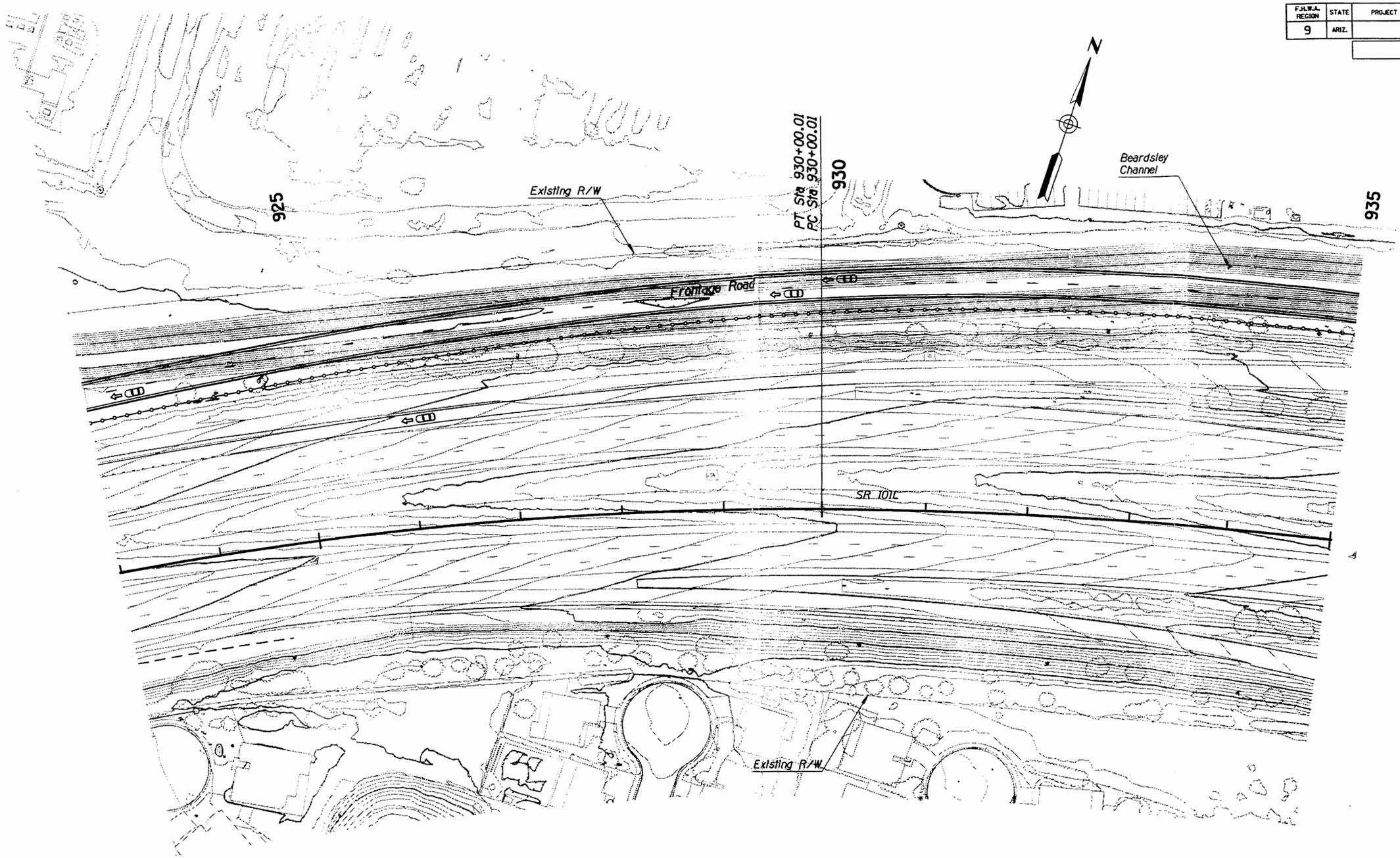
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



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DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter & Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

TRACS NO.

SHEET OF

___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

N

935

940

945

Existing R/W

Beardsley Channel

Frontage Road

Existing SB On-Ramp

SR 101L

75th Avenue

CS Sta 944+68.20

ST Sta 948+43.20

Existing R/W

	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter::Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

TRACS NO.

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

SHEET OF ___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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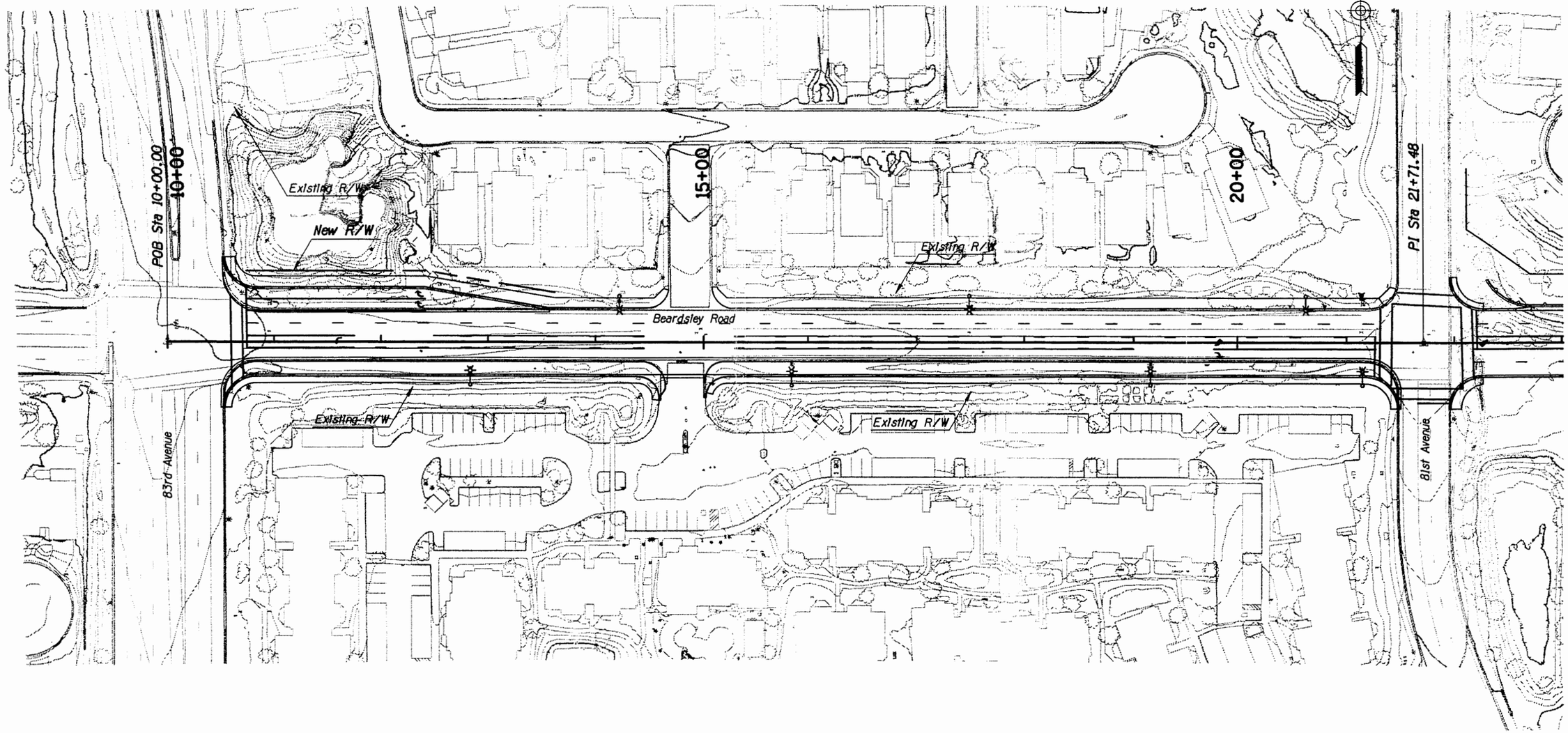
9	ARIZ.				



	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter-Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

SHEET OF ___ OF ___

TRACS NO.

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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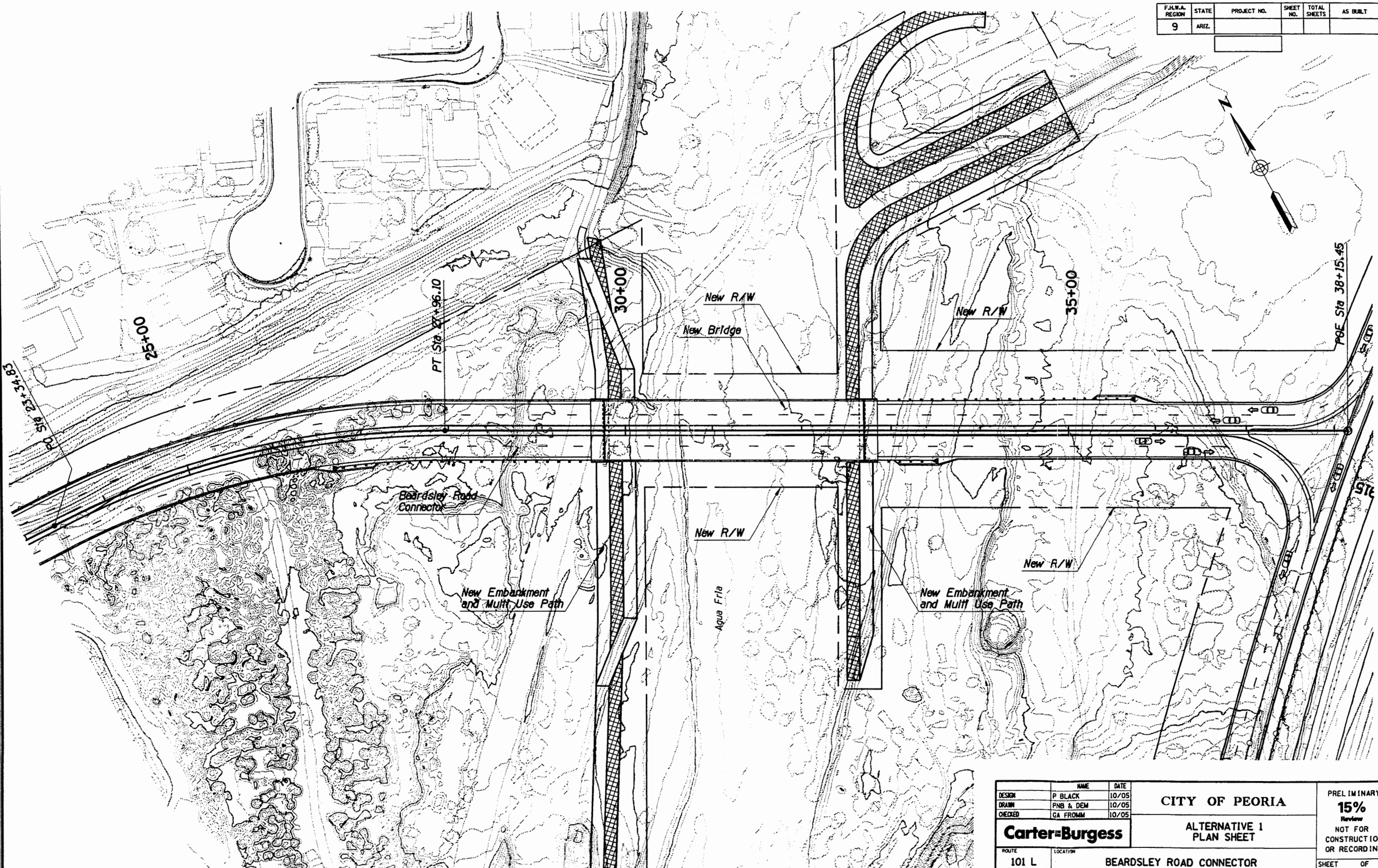
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
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Carter & Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	SHEET	OF
101 L	BEARDSLEY ROAD CONNECTOR		
TRACS NO.			___ OF ___

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO.

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9.2 PLANS FOR ALTERNATIVE 1

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

N

865

870

875

880

P1 878+00.00

POB 865+94.28

Existing R/W

Existing Access Control

New Braided Ramp Structure

New U-Turn Structure

New U-Turn Ramp

SR 101L

Union Hills Drive

Curb & Gutter Location for Future L101 Widening

Existing R/W

	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter=Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	SHEET OF
101 L	BEARDSLEY ROAD CONNECTOR	
TRACS NO.		___ OF ___

DATE- | LOCATION- | REVISIONS- | FINISHED PLANS- | SURVEY NO.

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

880

885

890

TS Sta 884+33.10

SC Sta 887+58.10

Existing R/W

Existing Access Control

New R/W

96'

To U-Turn Ramp

Union Hills

Union Hills Off-Ramp

SR 101L

Existing R/W

	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter-Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

SHEET OF

TRACS NO.

___ OF ___

DATE-
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REVISIONS-
FINISHED PLANS-
SURVEY NO.

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
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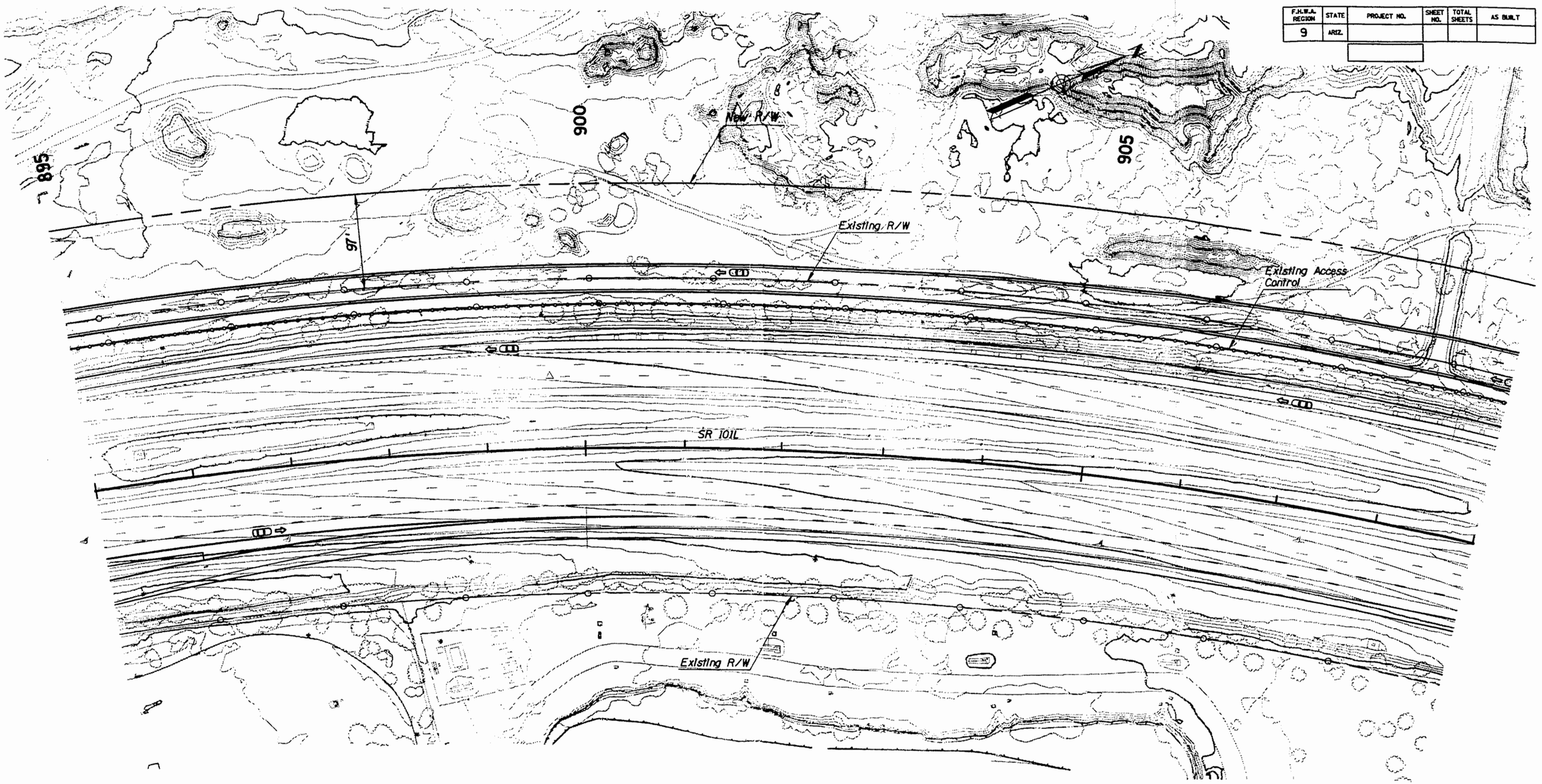

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DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter-Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

ROUTE 101 L

LOCATION BEARDSLEY ROAD CONNECTOR

TRACS NO.

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15%
Review
NOT FOR CONSTRUCTION OR RECORDING

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SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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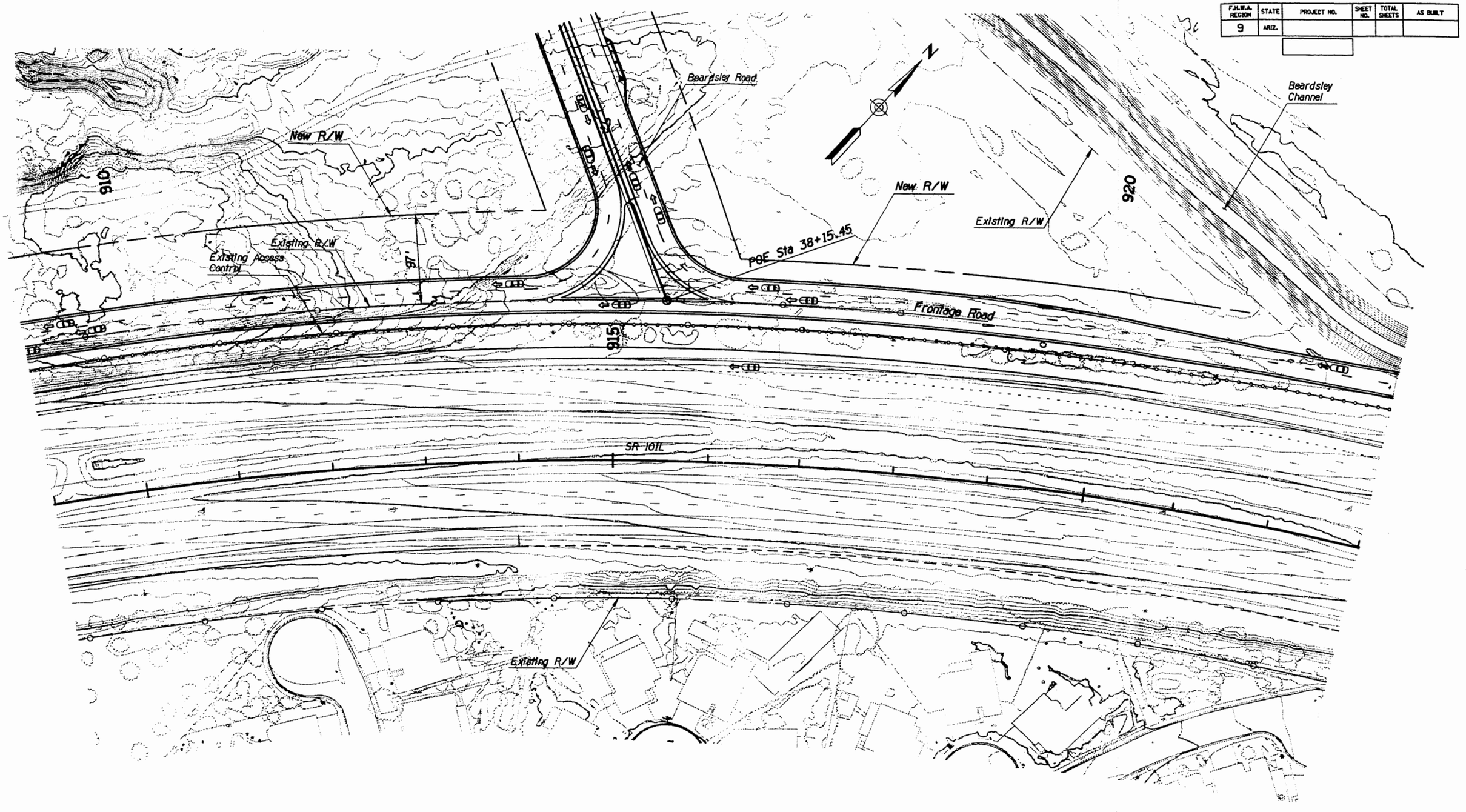
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	GA FROMM	10/05

Carter & Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

TRACS NO.

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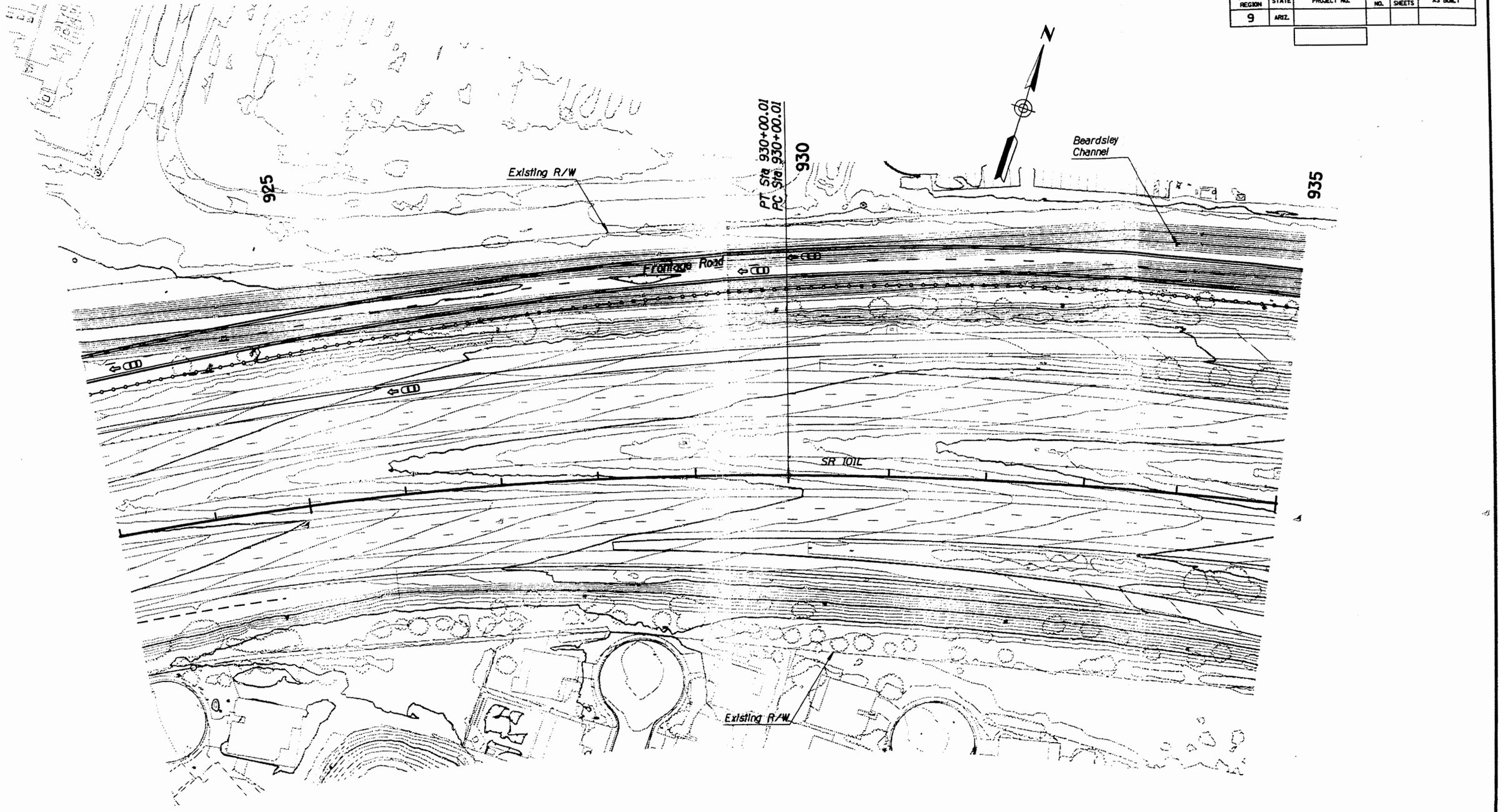
FHWA REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



	NAME	DATE
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DRAWN	PNB & DEM	10/05
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Carter-Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

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15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE: 101 L

LOCATION: BEARDSLEY ROAD CONNECTOR

SHEET OF

TRACS NO.

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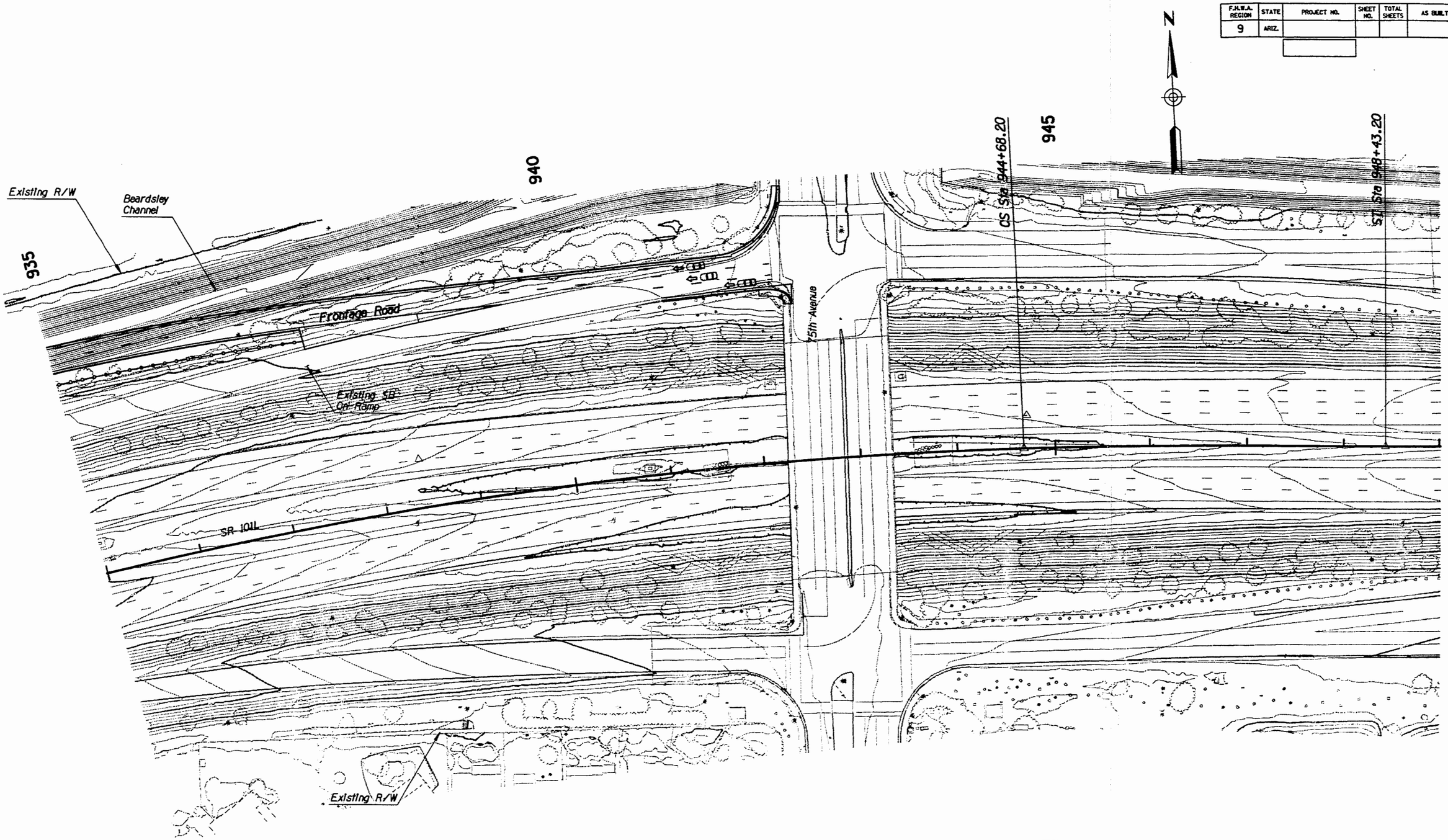
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				



	NAME	DATE
DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
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Carter Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

TRACS NO.

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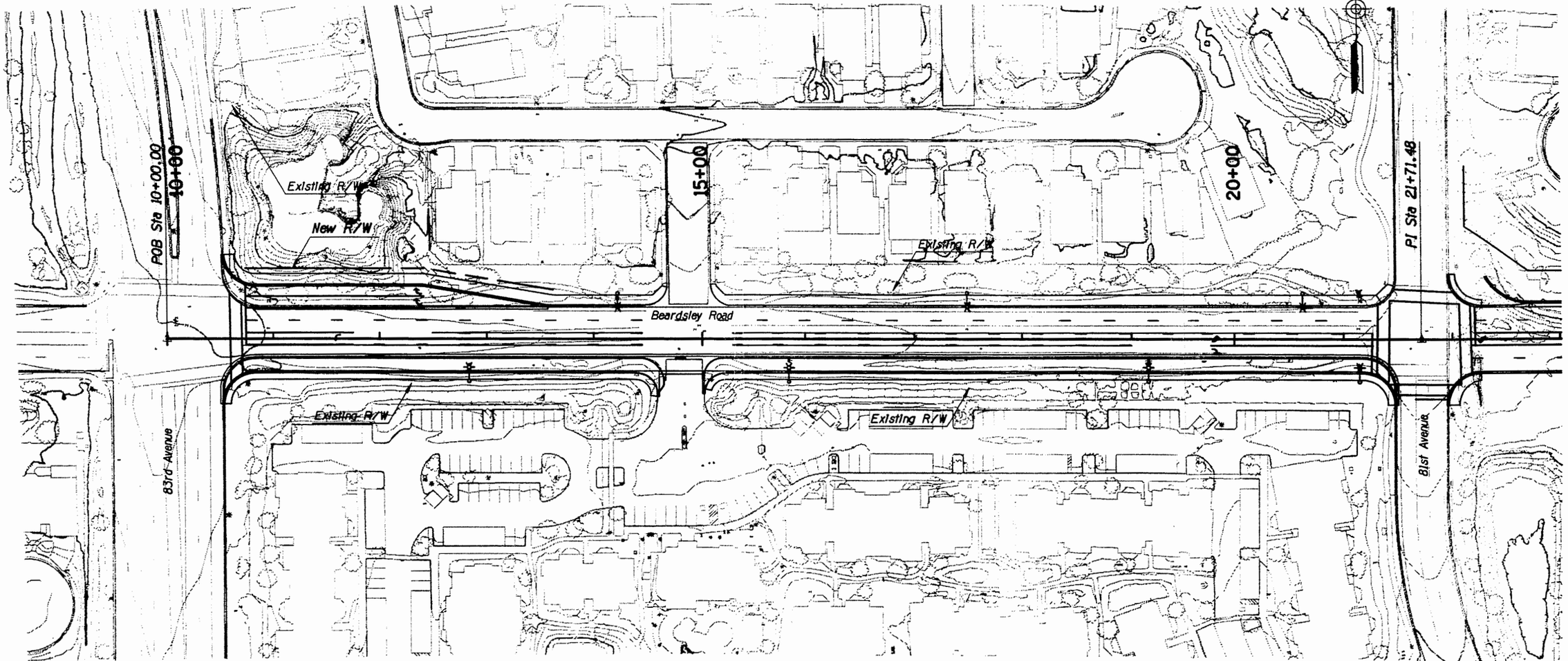

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Carter=Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

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ROUTE	LOCATION
101 L	BEARDSLEY ROAD CONNECTOR

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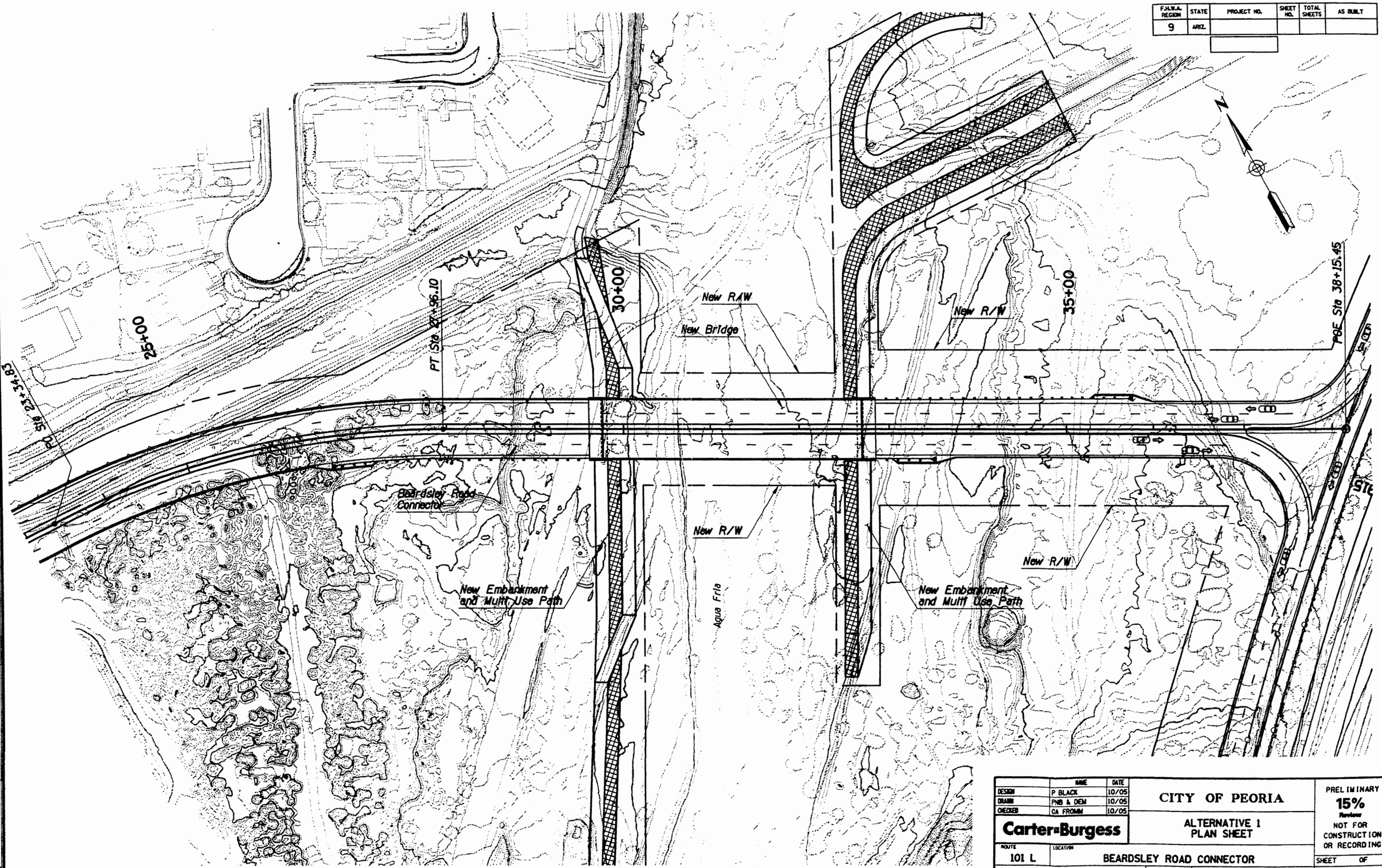

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DESIGN	P BLACK	10/05
DRAWN	PNB & DEM	10/05
CHECKED	CA FROMM	10/05

Carter&Burgess

CITY OF PEORIA

ALTERNATIVE 1
PLAN SHEET

PRELIMINARY
15%
Review
NOT FOR CONSTRUCTION OR RECORDING

ROUTE	LOCATION	SHEET	OF
101 L	BEARDSLEY ROAD CONNECTOR		
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SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE- | SURVEY NO.

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9.3 PRELIMINARY COST ESTIMATE FOR RECOMMENDED ALTERANTIVE

ITEMIZED COST ESTIMATE

BEARDSLEY ROAD CONNECTOR

Summary of Cost Estimate

Beardsley Road (83rd - 81st)	340,822
Fletcher Heights Channel	515,499
Beardsley Road (81st Avenue to Loop 101 Frontage Road)	6,311,668
Southbound Frontage Road With Ramps	4,823,321
U - Turn Ramp With Structure (at Union Hills Drive)	2,632,706
Northbound Ramp (Union Hills Drive)	724,611
Total Project Cost	$15,348,628

BEARDSLEY ROAD CONNECTOR

BEARDSLEY ROAD (83rd To 81st Avenues)

ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Remove Existing Pavement	Sq. Yd.	120	4.00	480
Remove Existing Curb & Gutter	L. Ft.	1,100	3.00	3,300
Remove Existing Sidewalk	Sq. Ft.	7,500	2.00	15,000
Remove Catch Basin	Each	1	1,500.00	1,500
Grading Roadway for Pavement	Sq. Yd.	1,500	5.00	7,500
Aggregate Base	Cu. Yd.	326	35.00	11,410
Asphalt Concrete	Ton	500	70.00	35,000
AR-ACFC	Ton	43	85.00	3,655
Curb & Gutter	L. Ft.	1,100	15.00	16,500
Sidewalk	Sq. Ft.	8,000	8.00	64,000
Catch Basin	Each	1	3,500.00	3,500
Concrete Pipe	L. Ft.	20	75.00	1,500
Relocate Street Lights	Each	7	2,500.00	17,500
Miscellaneous Signal Work	L. Sum	1	20,000.00	20,000
Striping	L. Ft.	3,300	0.25	825
Signage	L. Sum	1	5,000.00	5,000
Landscaping	L. Sum	1	10,000.00	10,000
	SUBTOTAL			216,670
Erosion Control (1%)	L. Sum	1	2,167	2,167
Quality Control (2%)	L. Sum	1	4,333	4,333
Water Supply and Dust Palliative (2%)	L. Sum	1	4,333	4,333
Maintenance and Protection of Traffic (7%)	L. Sum	1	15,167	15,167
Construction Surveying and Layout (2%)	L. Sum	1	4,333	4,333
Mobilization (7%)	L. Sum	1	15,167	15,167
Erosion/Mobilization Total				45,501
	SUBTOTAL			262,171
Construction Engineering & Contingencies (30%)				78,651
TOTAL - BEARDSLEY ROAD (83rd To 81st Avenues)				$340,822

ITEMIZED COST ESTIMATE

BEARDSLEY ROAD CONNECTOR

FLETCHER HEIGHTS CHANNEL

ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Clearing and Grubbing	L. Sum	1	500.00	500
Removal of Structures & Obstructions	L. Sum	1	1,000.00	1,000
Channel Excavation	Cu. Yd.	470	3.00	1,410
Borrow	Cu. Yd.	1,130	5.00	5,650
Retaining Wall (North bank of channel)	Sq. Ft.	1,650	50.00	82,500
Retaining Wall (South bank of channel)	Sq. Ft.	3,750	65.00	243,750
Handrail (On North retaining wall)	L. Ft.	272	35.00	9,520
Reconstruct pipe from Cul-de-Sac thru retaining wall	L. Sum	1	500.00	500
Landscaping (in channel)	L. Sum	1	5,000.00	5,000
Conc. Barrier (along north edge of roadway)(42" H)	L. Ft.	410	50.00	20,500
	SUBTOTAL			370,330
Erosion Control (1%)	L. Sum	1	3,703	3,703
Quality Control (2%)	L. Sum	1	7,407	7,407
Water Supply and Dust Palliative (2%)	L. Sum	1	5,142	7,407
Maintenance and Protection of Traffic (2%)	L. Sum	1	5,142	7,407
Construction Surveying and Layout (2%)	L. Sum	1	5,142	7,407
Mobilization (7%)	L. Sum	1	25,923	25,923
Erosion/Mobilization Total				59,253
	SUBTOTAL			429,583
Construction Engineering & Contingencies (20%)▲	L. Sum	1	85,917	85,917
TOTAL - FLETCHER HEIGHTS CHANNEL				$515,499

▲Because the Fletcher Heights Channel was completed to a more accurate design, only 5% was estimated for miscellaneous items (15% for Construction Engineering plus 5% for miscellaneous items).

BEARDSLEY ROAD CONNECTOR

BEARDSLEY ROAD (81st Avenue to Loop 101 Frontage Road)

ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Remove Structures & Obstructions	L. Sum	1	10,000.00	10,000
Roadway Excavation	Cu. Yd.	672	3.00	2,016
Borrow	Cu. Yd.	70,000	5.00	350,000
Aggregate Base	Cu. Yd.	1,936	35.00	67,760
Asphalt Concrete	Ton	2,925	70.00	204,750
AR-ACFC	Ton	256	85.00	21,760
Curb & Gutter	L. Ft.	1,614	15.00	24,210
Sidewalk	Sq. Ft.	547	8.00	4,376
Guardrail	L. Ft.	450	14.00	6,300
Guardrail End Treatment	Each	3	2,500.00	7,500
Guardrail Transitions	Each	3	800.00	2,400
Bank Protection	Cu. Yd.	4,200	80.00	336,000
Bridge over New River	Sq. Ft.	23,560	100.00	2,356,000
Lighting	L. Sum	1	85,000.00	85,000
Traffic Signal @ 81st Avenue	L. Sum	1	125,000.00	125,000
Striping	L. Ft.	6,750	0.20	1,350
Signage	L. Sum	1	75,000.00	75,000
Drainage (CBs & Laterals)	L. Sum	1	50,000.00	50,000
Landscaping	L. Sum	1	25,000.00	25,000
	SUBTOTAL			3,754,422
Relocate APS High Voltage Pole	L. Sum	1	500,000	500,000
Erosion Control (1%)	L. Sum	1	37,544	37,544
Quality Control (2%)	L. Sum	1	75,088	75,088
Water Supply and Dust Palliative (2%)	L. Sum	1	75,088	75,088
Maintenance and Protection of Traffic (2%)	L. Sum	1	75,088	75,088
Construction Surveying and Layout (2%)	L. Sum	1	75,088	75,088
Mobilization (7%)	L. Sum	1	262,810	262,810
Erosion/Mobilization Total				1,100,708
	SUBTOTAL			4,855,130
Construction Engineering & Contingencies (30%)	L. Sum	1	1,456,539	1,456,539
TOTAL - BREADSLEY ROAD (81st Avenue to Loop 101 Frontage Road)				$6,311,668

BEARDSLEY ROAD CONNECTOR

SB Frontage Road With Ramps (WB Off-Ramp west of 75th Ave. & SB On-Ramp @ Union Hills Drive)

ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Remove Structures and Obstructions	L. Sum	1	100,000	100,000
Roadway Excavation	Cu. Yd.	10,000	3.00	30,000
Borrow	Cu. Yd.	100,000	5.00	500,000
Aggregate Base	Cu. Yd.	7,200	35.00	252,000
Asphalt Concrete	Ton	10,870	70.00	760,900
AR-ACFC	Ton	1,267	85.00	107,695
Curb & Gutter	L. Ft.	15,148	15.00	227,220
Concrete Half Barrier	L. Ft.	4,400	50.00	220,000
Concrete Median Barrier	L. Ft.	590	65.00	38,350
Drainage	L. Sum	1	200,000	200,000
Roadway Lighting	L. Sum	1	100,000	100,000
Striping	L. Ft.	40,620	0.25	10,155
Signage	L. Sum	1	220,000	220,000
Landscape Irrigation	L. Sum	1	25,000	25,000
Landscaping	L. Sum	1	75,000	75,000
Reconstruct Sanitary Sewer	L. Sum	1	200,000	200,000
	SUBTOTAL			3,066,320
Erosion Control (1%)	L. Sum	1	30,663	30,663
Quality Control (2%)	L. Sum	1	61,326	61,326
Water Supply and Dust Palliative (2%)	L. Sum	1	613,264	61,326
Maintenance and Protection of Traffic (7%)	L. Sum	1	214,642	214,642
Construction Surveying and Layout (2%)	L. Sum	1	61,326	61,326
Mobilization (7%)	L. Sum	1	214,642	214,642
Erosion/Mobilization Total				643,927
	SUBTOTAL			3,710,247
Miscellaneous, Engineering & Contingencies (30%)				1,113,074
TOTAL - SB Frontage Road With Ramps (WB Off-Ramp west of 75th Ave. & SB On-Ramp @ Union Hills Drive)				$4,823,321

BEARDSLEY ROAD CONNECTOR

U-Turn Ramp With Structure (at Union Hills Drive)

ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Removal of Structures and Obstructions	L. Sum	1	25,000.00	25,000
Borrow	Cu. Yd.	5,000	5.00	25,000
Aggregrate Base	Cu. Yd.	1,230	35.00	43,050
Asphalt Concrete	Ton	1,864	70.00	130,480
AR-ACFC	Ton	217	85.00	18,445
Curb & Gutter	L. Ft.	630	15.00	9,450
Concrete Half Barrier	L. Ft.	867	50.00	43,350
Concrete Median Barrier	L. Ft.	2,328	65.00	151,320
Barrier End Treatment (West Approach)	Each	1	5,000.00	5,000
Drainage	L. Sum	1	100,000.00	100,000
Structure (U-Turn)	Sq. Ft.	10,000	100.00	1,000,000
Retaining Walls	Sq. Ft.	600	50.00	30,000
Roadway Lighting (Two Poles)	L. Sum	1	30,000.00	30,000
Striping	L. Ft.	10,358	0.25	2,590
Signage (6-8 Minor Signs)	L. Sum	1	10,000.00	10,000
Reconstruct Landscape Irrigation	L. Sum	1	20,000.00	20,000
Landscaping	L. Sum	1	30,000.00	30,000
	SUBTOTAL			1,673,685
Erosion Control (1%)	L. Sum	1	16,737	16,737
Quality Control (2%)	L. Sum	1	33,474	33,474
Water Supply and Dust Palliative (2%)	L. Sum	1	33,474	33,474
Maintenance and Protection of Traffic (7%)	L. Sum	1	117,158	117,158
Construction Surveying and Layout (2%)	L. Sum	1	33,474	33,474
Mobilization (7%)	L. Sum	1	117,158	117,158
Erosion/Mobilization Total				351,474
	SUBTOTAL			2,025,158
Miscellaneous, Engineering & Contingencies (30%)	L. Sum	1	607,547	607,547
TOTAL - U-Turn Ramp With Structure (at Union Hills Drive)				$2,632,706

ITEMIZED COST ESTIMATE

BEARDSLEY ROAD CONNECTOR

Northbound On-Ramp (Union Hills Drive)

ITEMS	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Removal of Structures & Obstructions	L. Sum	1	25,000.00	25,000
Roadway Excavation	Cu Yd.	780	3.00	2,340
Borrow	Cu. Yd.	3,550	5.00	17,750
Aggregate Base	Cu. Yd.	1,893	35.00	66,255
Asphalt Concrete	Ton	2,861	70.00	200,270
AR-ACFC	Ton	333	85.00	28,305
Curb & Gutter	L. Ft.	1,382	15.00	20,730
Drainage	L. Sum	1	25,000.00	25,000
Roadway Lighting	L. Sum	1	50,000.00	50,000
Striping	L. Sum	10,423	0.25	2,606
Signage (4-6 Minor Signs)	L. Sum	1	7,400.00	7,400
Landscaping	L. Sum	1	15,000.00	15,000
	SUBTOTAL			460,656
Erosion Control (1%)	L. Sum	1	4,607	4,607
Quality Control (2%)	L. Sum	1	9,213	9,213
Water Supply and Dust Palliative (2%)	L. Sum	1	9,213	9,213
Maintenance and Protection of Traffic (7%)	L. Sum	1	32,246	32,246
Construction Surveying and Layout (2%)	L. Sum	1	9,213	9,213
Mobilization (7%)	L. Sum	1	32,246	32,246
Erosion/Mobilization Total				96,738
	SUBTOTAL			557,393
Miscellaneous, Engineering & Contingencies (30%)	L. Sum	1	167,218	167,218
TOTAL - Northbound Ramp (Union Hills Drive)				$724,611